VOL. LXXXVI PART ONE

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

JANUARY 1961

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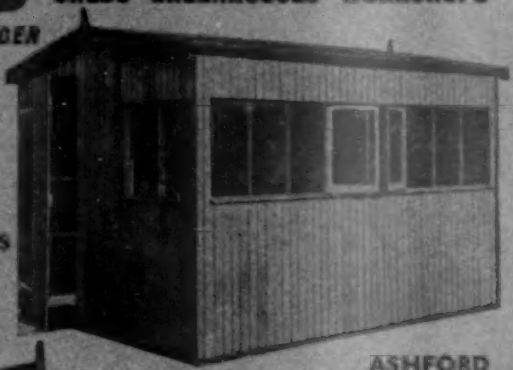

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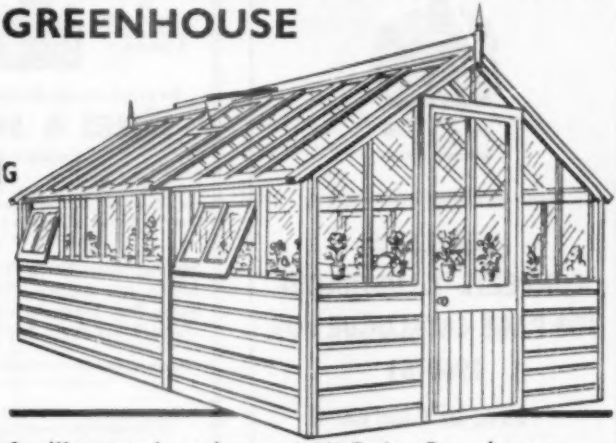

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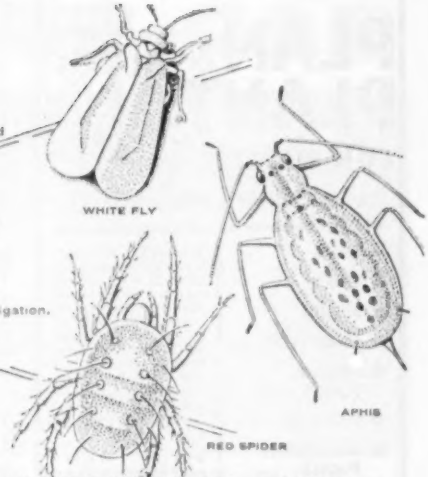

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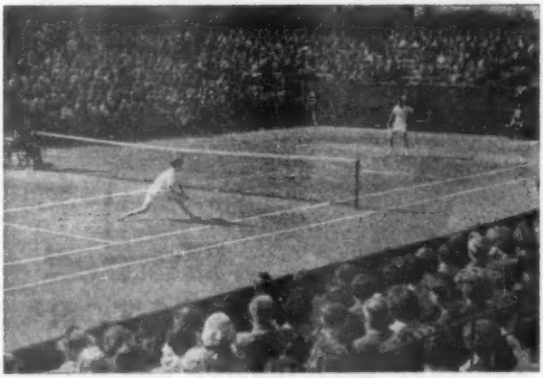

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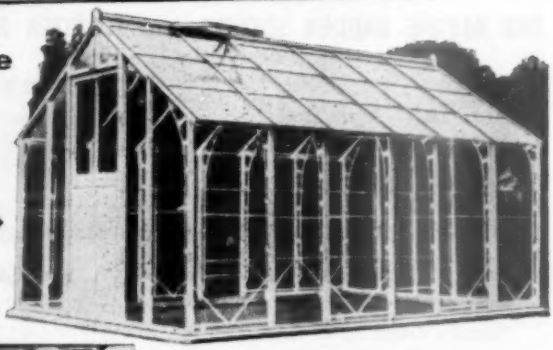

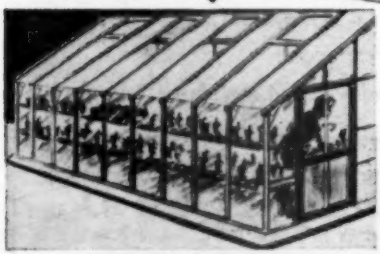

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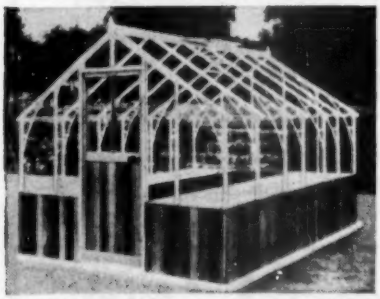

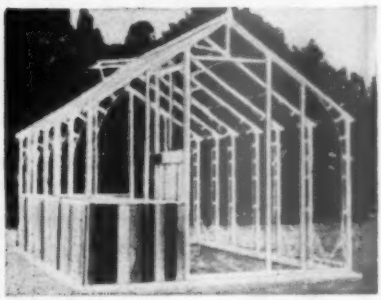

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VOL. LXXXVI PART ONE

JANUARY 1961

THE SECRETARY'S PAGE

ANNOUNCEMENTS—JANUARY AND FEBRUARY

Shows

TUESDAY, January 24, 12 NOON to 6 P.M. WEDNESDAY, January 25, 10 A.M. to 5 P.M.	Fortnightly Flower Show and Ornamental Plant Competition, in the New Hall.
TUESDAY, February 14, 12 NOON to 6 P.M. WEDNESDAY, February 15, 10 A.M. to 5 P.M.	Fortnightly Flower Show and Ornamental Plant Competition, in the New Hall.
TUESDAY, February 28, 12 NOON to 6 P.M. WEDNESDAY, March 1, 10 A.M. to 5 P.M.	Fortnightly Flower Show, in the New Hall. Annual General Meeting at 3 p.m. on February 28, in the Old Hall.

Lectures

TUESDAY, January 24, at 3 p.m. "In search of Cacti in Arizona and Mexico", by LT.-GEN. SIR OLIVER LEESE, BT., K.C.B., C.B.E., D.S.O., and LADY LEESE.

TUESDAY, February 14, at 3 p.m. "Plants at Inshriach", by MR. J. DRAKE.

Annual General Meeting—The Annual General Meeting to receive the Report of the Council for 1960 and a statement of accounts for that year will be held on Tuesday, February 28, 1961, at 3 P.M. The Meeting will be held in the Old Hall, as in 1960, in order that there may be ample room for all who wish to attend. It is hoped that as many Fellows as possible will be present.

Demonstration at Wisley—On February 22 there will be a demonstration at Wisley on the pruning of roses, commencing at 2 P.M. It will be repeated at the same time on February 23 and 24.

Winter-flowering Plant Competition—In order to bring to the notice of Fellows some of the plants which bloom in the open during the winter and early spring, three competitions for ornamental plants grown in the open by amateurs will be held during the first three months of 1961, one on January 24 and 25, another on February 14 and 15 and the third on March 14 and 15. Schedules may be obtained from the Secretary.

Orchid Committee Meeting on January 10, 1961—If necessary the Orchid Committee will meet on Tuesday, January 10, 1961, to consider novelties. Anyone wishing to submit a novelty to the Committee on January 10 must inform the Secretary by January 2, 1961, but earlier if possible, so that the necessary arrangements may be made.

The Society's Examinations in 1961—Candidates wishing to enter for the Society's Examinations in Horticulture to be held in 1961 are reminded that the closing dates for the receipt of entry forms are as follows: General Examination in Horticulture—Monday, January 9, 1961; National Diploma in Horticulture, Intermediate and Final Examinations, and N.D.H. Honours—Wednesday, February 1, 1961; Teachers' Diploma in School Gardening, Intermediate and Final Examinations—Wednesday, February 1, 1961.

The Third International Rock Garden Plant Conference—This Conference, which is being arranged jointly by The Alpine Garden Society and The Scottish Rock Garden Club, will be held in London and Edinburgh from April 18 to April 28.

The Alpine Garden Society's Conference opens in London on April 18 and in addition to the series of lectures and a Conference Dinner, excursions will be made to Wisley, Kew, Windsor Great Park and the University Botanic Garden, Cambridge.

The Scottish part of the Conference opens in Edinburgh on April 24 and the programme will include a series of papers, a Conference Luncheon and visits to the gardens at Keillour Castle, Methven and Branklyn, Perth. A Reception will be given by the City and Royal Burgh of Edinburgh in the evening of April 24.

Exhibitions of alpine and rock garden plants and shrubs arranged in connection with the Conference will be staged in the New Hall, Greycoat Street, Westminster on April 18 and 19, and in The Music Hall, George Street, Edinburgh, on April 25, 26 and 27.

Conference programmes, price 6*d*., may be obtained from the

Secretaries of the societies, at the following addresses: C. B. Saunders, Esq., Secretary, The Alpine Garden Society, Husseys, Green Street Green, Farnborough, Kent; Sqd. Ldr. J. J. Boyd-Harvey, Hon. Secretary, The Scottish Rock Garden Club, Boonslie, Dirleton, E. Lothian.

Journal and Botanical Magazine Binding—Arrangements have been made for those Fellows who so wish to have the JOURNAL bound in green cloth with the lettering and crest in gold. The cost for each volume of twelve parts will be 13*s.* 6*d.*, including packing and postage. Fellows may also have the *Botanical Magazine* bound in dark blue buckram with gold lettering. The cost for each volume will be 18*s.* 6*d.*, including packing and postage. Parts for binding should be sent with remittance to Messrs. Mansell (Bookbinders) Ltd., 41 Britannia Row, Essex Road, London, N.1. The parts should not be sent to the offices of the Society. Inquiries for binding in special styles should also be addressed direct to Messrs. Mansell (Bookbinders) Ltd.

Proceedings of The Third World Orchid Conference—This report, which will be published in January, contains *all* the papers delivered at the Conference as well as a number of others which could not be read by their authors. It also contains numerous illustrations in colour and black and white. The price has been fixed at 2 guineas, post free, or $6.00 U.S.A. Obtainable from the Secretary, The Royal Horticultural Society, Vincent Sq., London, S.W.1.

The Registration of the Names of Bulbous Plants—In order to prevent the confusion which must inevitably arise if new cultivars (varieties) are named without regard to the names already in use, the International Horticultural Congress has appointed a number of registration authorities to register for various important groups of plants cultivar names which are available and in other ways conform to the International Code for the Nomenclature of Cultivated Plants. Under those arrangements The Royal Horticultural Society is the International Registration Authority for, among other plants, narcissi and lilies. For most other bulbous and tuberous-rooted plants (but excluding gladioli and dahlias) the International Registration Authority is the Koninklijke Algemeene Vereeniging voor Bloembollencultuur (Royal General Bulb-growers' Society) of Wilhelminastraat 45, Haarlem, Holland. Raisers and others wishing to give cultivar names to new varieties of such plants as crocuses, freesias, hyacinths and nerines should submit the proposed named to that Society. The registration fee is 2*s.* 6*d.* a name.

NOTES FROM WISLEY

PLANT DISEASES

D. E. Green and Audrey V. Brooks

(*Plant Pathology Department*)

ENQUIRIES about plant diseases received at Wisley during the 1960 season have increased in number, and although this in part may be a result of the very wet season, it is also a fact that all kinds of enquiries tend to increase as each year passes. In our experience, the largest number of enquiries for any particular plant is concerned with diseases of the rose of which Black Spot, *Diplocarpon rosae*, is quite the best known, but the spray called Captan seems to be very satisfactory for keeping it down.

Some rose diseases do not seem to be influenced by the weather and we may mention Powdery Mildew, *Sphaerotheca pannosa*, which was common last summer. It can be kept under control by use of the spray called Karathane, but it must be remembered that dryness at the roots, by lowering the resistance of the plant, will encourage mildew attack. This is the reason why in some localities rose mildew was just as severe in the dry season of 1959.

We also believe that many enquiries received about trouble in trees and shrubs were examples of weakness still showing after the extreme drought of 1959. Other enquiries in the current season related to excessive soil wetness which interfered with good root action, but this kind of trouble was mostly met with in smaller plants especially annuals. It must not be forgotten that although last summer was wet, there was a very dry period with high temperatures in late spring and some plants, especially those recently planted, suffered from lack of water for a time.

One of the first diseases seen in springtime and which we suspect is on the increase, is the one called Azalea Gall, *Exobasidium vaccinii*. This fungus, which causes the leaves to swell up into white galls, can attack all kinds of azaleas and small-leaved rhododendrons, and it seems to be quite common on the dwarf Kurume azaleas which are becoming so popular in the small garden. It is a disease that often goes unnoticed, but could quite easily become a nuisance. It may be that cutting off the galls and burning them whenever seen is sufficient to prevent this disease from getting serious.

Rhododendron enquiries in number appear second on the list to roses, but there is a great difference between the two. The majority of rhododendron specimens show no foliage disease, but symptoms indicating faulty root action or perhaps root disease. Rhododendrons in fact can still be considered as plants remarkably free from any serious leaf disease. In our opinion many people not only fail to study the soil

conditions sufficiently but are also guilty of faults such as planting too deeply on heavy soils.

A rather strange condition which we think was connected with the drought effects of 1959 was "blindness" in daffodil flowers to which the variety 'Texas' seems very susceptible. The unopened flower buds turned brown and died even when fairly well advanced and we take this to have been caused in part by the foliage finishing growth and dying off exceptionally early in 1959, although dryness in the spring of 1960 might also have contributed to this failure.

The wet season was ideal for well known fungi such as the Grey Mould fungus, *Botrytis cinerea*, and its near relatives. Grey Mould has been seen on all kinds of leaves, and in particular at Wisley it killed a very large number of leaves on young currant bushes, which appeared as if blighted, although in a normal season this fungus would have little chance of injuring them. On paeonies also the Grey Mould fungus or its close relative the Paeony Stem Wilt fungus, *Botrytis paeoniae*, has been responsible for a good deal of browning and killing of the upper leaves. Exactly which fungus is concerned will be investigated at Wisley, if possible during the coming season. Even the leaves of large trees such as catalpas suffered to some extent from this leaf scorch caused by the Grey Mould fungus during the wet season.

These days we do not see much Antirrhinum Rust, *Puccinia antirrhini*, and this may be because the resistant varieties are more commonly grown. At least we like to think that this is the case. There are still localities in which the disease persists and from which we still receive specimens showing severe attack.

There was a large number of cases of root rots such as the well known Root Rot of peas caused by the soil fungus *Aphanomyces euteiches* and Black Root Rot, *Thielaviopsis basicola*, which diseases are naturally associated with wet soil conditions. We notice that although we get plenty of enquiries about Cabbage Club Root, *Plasmodiophora brassicae*, and Potato Blight, *Phytophthora infestans*, few people now send specimens, and possibly this is because these two diseases are so well known.

We would like to remind Fellows who grow grapes in small glasshouses that even in the past wet season we have seen Scald on the berries and they should remember that if ventilation is not adequate enough to avoid surplus moisture, even a very short period of hot sunshine may injure many of the berries.

The new disease called Fire Blight, *Erwinia amylovora*, has recently been found in Cambridgeshire although in the main it is confined to the south-eastern counties. We still get enquiries as to whether this disease is present on such specimens as lilac or even privet shoots, and it is necessary to remind readers that the plants it attacks are those belonging to the family *Rosaceae*. Pears are most susceptible, apples and quinces less so, but it is possible for the disease to infect hawthorn, cotoneaster, firethorn (*Pyracantha*), mountain ash and whitebeam.

As regards virus diseases, we have nothing out of the ordinary to report, except that the virus affecting *Passiflora* (Passion Flower) seems to be more common. The symptoms on the leaves are puckering, crinkling and the appearance of very small yellowish spots when the leaves are young. Where an old plant shows this virus, although it may not be severely affected, it is just as well to raise some seedlings in isolation with a view to replacing the old plant. Another virus which we think needs mentioning is the Mosaic disease of vegetable marrows. This virus unfortunately attacks many other garden plants and weeds and seems to be one of the commonest that gardeners have to contend with. Aphids transmit this virus, but apart from spraying the plants when young to keep aphids away, most gardeners would be well advised to raise double the number of required plants so that losses from this virus can be tolerated.

INVITED TRIAL, 1961

The Royal Horticultural Society will carry out at its Gardens during 1961 the following trial, for which entries are now invited:

FLOWERS

From Tubers

Smithiantha (commonly grown as *Gesneria* or *Naegelia*);
12 tubers of each variety are required.

Conditions for entry to the Trials

1. All the entries must be made on the appropriate forms obtainable from The Director, The Royal Horticultural Society's Gardens, Wisley, Ripley, Woking, Surrey. One form should be completed for each entry. Entrants making application for entry forms are requested to state the number of forms required.

2. The entrant must certify on the form either:
   (a) that the variety has been raised by him
   or (b) that the variety was, or is about to be, introduced by him to British Commerce.

3. Entry forms must be completed and returned to Wisley not later than *January* 31, 1961. Entries received after that date cannot be considered for inclusion in the trials.

4. Tubers *should not be sent* until the entrant receives notification that his entry has been accepted.

5. In the event of too many entries being submitted for the trial, the Council of The Royal Horticultural Society reserves the right to scale down the number of entries received.

PLANNING AND PLANTS FOR THE SMALL GARDEN

PART I

David Wright

MY object in this article is to help people through hints and suggestions, to get the best out of plants in respect of their forms and colours, or in the words of MISS GERTRUDE JEKYLL, to "paint a garden-picture".

The well-known art critic, CLIVE BELL, used to talk a lot about the "creation of *significant form*". I have a similar preoccupation. In this case, the artist is the gardener and the "significant forms" are to be found among plants, trees and shrubs.

It is true that there are good books on garden design but they nearly all deal with the matter on a scale beyond the scope of the average person's pocket. Also they suggest schemes which often require considerable upkeep. (Work is necessary to create a garden: a garden should not exist to create work.)

This article does not profess to deal anything like exhaustively with the subject. All that is done is to outline certain basic principles, without which one cannot hope to have a satisfying and significant garden, but which are nearly everywhere neglected or ignored.

Two or three concepts of design are suggested, which while in no way nullifying conventional practice, do offer to the reader, alternatives to the usual, and release from the boredom of sameness and repetition. Then a few planting schemes are suggested.

I. OUTLINE OF BASIC PRINCIPLES

(1) A garden should be attractive in January as well as in June, although, of course, certain seasons of the year are bound to represent climaxes of colour, and of effectiveness in general.

A dictum that might well be more often observed, runs—"The test of a good garden is what it looks like in January".

(2) The forms and textures of plants are as important to the total effect of a garden, as their colours. In practice, this means valuing foliage equally with flowers. We must train ourselves to be aware of the *shapes* of leaves and flowers, the branch structure or tracery of trees in winter. Form, texture and colour are all integral parts of a total unity.

(3) It follows from the first two principles that at least 50 per cent (and possibly up to 70 per cent) of any planting, should be *evergreen*.

This must apply especially to small urban and suburban gardens, where the surroundings may be unattractive or uncongenial. On the other hand, a park-like area with a natural and attractive framework of surrounding woods and hills, could consist wholly of deciduous trees

and still be presentable at all times of the year, providing that the trees were chosen for beauty of shape and stem as well as of summer foliage.

(4) It is vitally necessary to *enlarge and enrich the concept of colour beyond the bounds of orthodox practice*, to include, for instance, the very pale yellows, creams, greenish yellows, greeny whites, and grey-blues in flowers; and the beiges, sepias and burnt siennas in the domain of autumn leaves.

A good deal more restraint than is usual, should be exercised in the use of pinks and beetroot tints. (This applies particularly to rhododendrons and the florists' strains of popular annuals.)

We should train the eye to see the colour of *everything*, not only of flowers, that is, we must learn to look at the nuances and tones of barks, stems, twigs and leaves.

On the other hand, while pastel colours should predominate in the gardens of a country whose prevailing landscape tone is soft, one certainly should not omit the more striking colours. Both have a place in design; for instance, the more eye-catching colours are needed for distant views, where a creamy yellow might look like discoloured foliage.

Also, it is worth remembering that rich dark reds and sumptuous deep purples can be as "quiet" as creams and pale yellows, and even quieter if shaded. Reds isolated in shade against a dark green background of holly or yew, can be superb.

(5) One must respect the tonalities of the surrounding landscape. Although one is not recreating the English landscape, but making something different with exotic materials, it is undesirable to use very flamboyant and over-opulent material, except in small quantities, mainly near the house or other architecture.

(6) One needs to respect the *scale* of the area to be planted. Avoid the common mistake of planting forest trees in the suburban "pocket-handkerchief" or cottage-garden.

Much more use might be made of columnar or fastigiate trees in the average restricted, and usually rectangular, site. In this context, one might exploit, far more frequently than is done, the interesting juxtaposition of contrasting shapes, say of the columnar and the "mushroom" shape, e.g. *Libocedrus decurrens* and *Betula pendula youngii*, or *Erica arborea alpina* and *Rhododendron impeditum*, or *Rosmarinus pyramidalis* and a dwarf lavender.

(7) There should be a reinstatement of the "park" or park-like area, as a basic concept (i.e. CAPABILITY BROWN over again in miniature) using modern material, namely the many desirable small trees introduced from China and Japan during this century such as, maples, rowans, cherries and magnolias. And this should be done both in the interests of labour-saving and of aesthetic significance.

Near the house, the "park" could thin out to avoid trees keeping sun from the rooms, and in this open area, might be included, say, an alpine meadow, rock outcrops, or drifts of heather and dwarf rhododendrons,

where the soil is lime free, or junipers, brooms and rock roses where it is limy.

Furthest away from the house, the "park" could merge into woodland if such naturally existed, or the planting of trees could be thickened to approximate to woodland. In this part of the layout, shade-loving plants such as rhododendrons, camellias, deutzias, hydrangeas and various lilies could be grown, thus providing a complete contrast to the sunny area by the house.

(8) Break down the artificial segregation of trees, shrubs and herbaceous plants, which has for so long bedevilled horticultural practice (although, incidentally, both WILLIAM ROBINSON and MISS GERTRUDE JEKYLL did advocate mixed borders at the turn of the last century!) (Fig. 2).

There should be a movement towards very open planting of shrubs, and scattered trees, with low-growing herbaceous perennials as ground covering drifts in between, and, of course, bulbs. This sort of thing has been done excellently in a more or less woodland setting at the Savill Gardens, Windsor Great Park.

The principle has doubtless long been applied to woodland areas, but could be much more widely practised on the average non-woodland site. It is a principle of planting that is essentially based on nature's own universal pattern, which, for the sake of a label, might be called "the layer system".

In this scheme of "layers", trees would be the top-most layer, shrubs the layer below this, herbaceous plants, such as paconies, irises, hellebores the next layer, and finally, ground covering plants such as geranium species, lily of the valley and periwinkles, thymes and heathers, would form the living ground-floor.

In this way even the smallest garden would, while being a creation in its own right, be firmly based on a natural system.

As an alternative to the strip of lawn flanked or framed by narrow borders, one might have a simple grid system of beds and paths, planted in the manner mentioned above. The freedom of the actual planting, together with complete ground-coverage, would modify the stiffness and formality of the grid.

(9) This is perhaps the point at which to put in a plea for the use of rarer plants, provided, of course, that they are hardy for the site in question. By enlarging and enriching the "palette" of plants, one could avoid much of the sameness, both of form and content, of most gardens.

(10) Seek diversity within unity, and unity within diversity. This idea emerges naturally out of those outlined in the last paragraph but one.

One should create a number of small areas within the main area, not necessarily segregated by hedges, but made distinct and separate through each having a dominant tone and character (Fig. 7).

For instance, in full sun, either on a bank, or up against the south side of a house, there might be a planting of "Mediterranean maquis" type

of plants, aromatic and resinous, such as rosemary, lavender, cistus, yuccas and ceanothus.

Corresponding to this, on the shady side of the house, but in complete contrast, there would be a bed devoted to ferns, lilies, hostas, camellias and skimmias: the dark glossy greens being a complete change from the greys of the sunny bed. Each bed, or planted area, would be quite different from the other, and yet each would be a unity within itself.

(11) Finally, be *bold* and *courageous* in planting a garden. As the late LORD ABERCONWAY used to say, "Find out what you can grow, and then grow *plenty of it*." Also, have what *you personally like*, whether or not it is popular and currently in fashion. If you happen to be passionately fond of *Gentiana acaulis*, and it does well with you, do not be afraid to grow a whole bed or border of it.

If you have the room and the means have a whole grove of eucryphias or embothriums, or a spinney devoted to magnolias! A garden of only rhododendrons, providing that they were chosen for diversity and beauty of *foliage*, and not merely of flowers, could be most satisfying and attractive. So could a rough grass area planted with trees selected solely for beauty of bark, such as snakebark maples, birches and willows.

It will be noticed that no mention has been made of boundary hedges and windscreens.

This, of course, is a subject of the first importance. Some landscape gardeners in their passion for opening up vistas of the surrounding countryside, though this, on the face of it, is admirable, expose a garden to winds which can do a great deal of damage to even the hardiest of plants.

On the other hand, hedges, as such, do involve a great deal of upkeep; therefore, if a windscreen is needed, plant *Chamaecyparis lawsoniana*, or *Thuja lobbii*, about 3 feet apart (the latter is ultimately a large tree, but can be clipped if so desired). *Cupressocyparis leylandii* is the fastest growing wind-screening evergreen in Great Britain, but usually, only small pot plants are available at nurseries.

II. SUGGESTIONS FOR PLANTING SCHEMES

When a garden has a site which is lovely in its own right, such as one including a bit of woodland, or simply fine individual trees, or where there is an attractive slope, especially a warm one facing south or south-west, the problem of layout is relatively simple.

It is a matter of closely relating the planting to *existing natural features*—such as grouping rock roses (helianthemums and halimiums), rosemaries, lavenders, heathers, etc., on a sunny bank (Fig. 5), or massing cyclamen round a tree-bole, or planting rhododendrons, camellias and magnolias under the natural canopy of trees, where the soil is lime free.

But 90 per cent of garden owners in modern England are not so fortunate to have this sort of site. And I am mainly concerned to make a few suggestions for the proverbial rectangular suburban plot, surrounded by neighbouring gardens.

There are, it seems to me, five main possibilities for such a site:

(*a*) *The Miniature Park.*
(*b*) *The Miniature Wood.*
(*c*) *The Formal Grid of Informally Planted Beds*, of trees and shrubs underplanted with herbaceous and ground covering plants (as at Hidcote Manor, Chipping Campden, Glos., and Tintinhull House, Yeovil, Somerset).
(*d*) *The Glade*, i.e. broad grass walk flanked by borders, and leading the eye to a specimen feature tree or large shrub, at the end, or through to a view of the adjoining landscape (Fig. 3).
(*e*) *The Lawn Framed by Borders*—possibly still the best idea for people who merely want the garden as somewhere to sit in during the summer or where children need room to play.

As (*d*) and (*e*) have, as far as I can see, been thoroughly worked out in general practice, I do not propose to spend any further time or space dealing with them.

(*a*) THE MINIATURE PARK

First of all, consider a person who wishes to look through his windows at a pleasant garden picture, but does not wish to be involved in any garden operations beyond, say, grass-cutting at weekends, and leaf sweeping for a week or so each autumn.

In this case, the entire plot could be put down to grass (unless a portion of it is needed for fruit and vegetables). If weekly mowing is possible, and desired, then the whole area can be made into lawn—otherwise, a small part round the house could be lawn, and the remainder rough grass, to be cut by autoscythe or similar machine, three or four times a season.

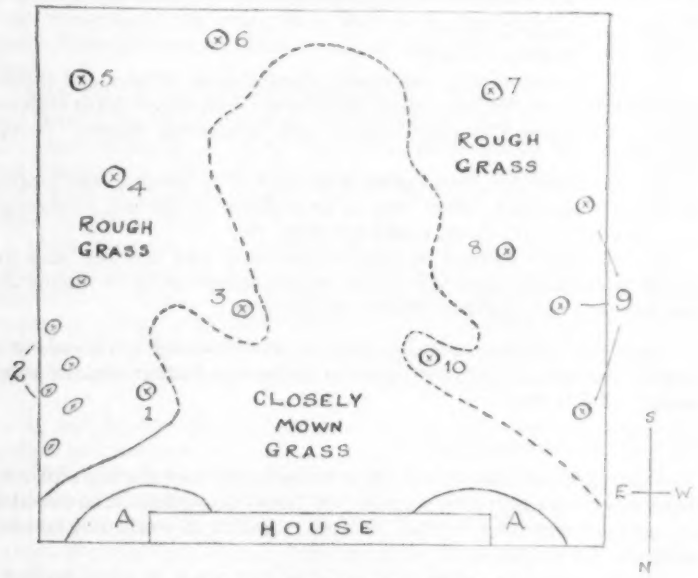
Then, a small "park" could be made by "dotting" or grouping trees, bearing in mind that one should only use trees of small dimensions and compact shapes.

As already suggested above, much more use should be made of columnar or fastigiate trees such as, *Carpinus betulus pyramidalis*, the upright form of the common hornbeam, *Fagus sylvatica fastigiata*, the Dawyk beech, *Acer lobelli*, *Prunus* 'Amanogowa', *P.* × *hillieri* 'Spire', *Sorbus hupehensis* and *S. commixta*, *Malus tschonoskii*, *Magnolia salicifolia fastigiata*.

Trees such as these could occasionally be juxtaposed to "mushroom-topped" or pendulous kinds. This has been wonderfully done at the great garden of Sheffield Park, Uckfield, Sussex (Fig. 4), where one sees *Betula pendula youngii* ("Weeping Birch") or *Pyrus salicifolia pendula* ("Weeping Silver Pear") next door to the dark green pencil of the

conifer, *Libocedrus decurrens* (*Chamaecyparis lawsoniana* 'Kilmacurrugh' would do equally well, if not better, for the small garden).

Also, remember to have at least one tree with a beautiful and interesting bark, such as *Acer griseum* or *Prunus serrula tibetica* (Figs. 6 and 8).



PLAN OF A SMALL PARK-LIKE AREA

1. *Betula pendula youngii* ("Weeping Birch").
2. Group of *Ilex altaclarense camelliaefolia* ("Broad-leafed Holly").
3. *Acer rufinerve* ("Snakebark Maple").
4. *Malus theifera* (late-flowering Crab).
5. *Prunus* × *hillieri* 'Spire' (pale pink early Cherry).
6. *Prunus* Tai Haku ("Great White Cherry").
7. *Acer lobelii* ("Columnar Maple". Glossy green leaf.)
8. *Aesulus indica* (late-flowering chestnut).
9. Group of *Libocedrus decurrens* (conifer).
10. *Pyrus salicifolia pendula* ("Weeping Silver Pear").

A. Beds of low-growing compact, mainly evergreen shrubs.

N.B. It is assumed that in this case, hedges and windscreens can be left out, as their inclusion would largely spoil the open park-like effect.

In a labour-saving grass-covered, tree planted area, *colour* (in the ordinary limited sense of the word) would be provided by beds of low-growing shrubs by the house. Here, the object would be to obtain a dense cushioned effect in contrast to the openness of the main area. The shrubs should be mainly evergreen, as too many deciduous shrubs, right under the windows, give a feeling of bareness, emptiness and even desolation, in the winter.

In particular, plants of *architectural quality*, and great *beauty of form* should figure in such positions. If the sites are reasonably sunny, one could plant dwarf rhododendrons of the *Lapponicum* Series, dwarf brooms such as *Genista dalmatica*, *G. lydia* and *G. hispanica*, *Cytisus kewensis*, rosemaries, especially var. *pyramidalis*. Taller columnar evergreens might be *Buxus balearica*, *Berberis valdiviana*, *Eucryphia* 'Nymansay' (or *E. intermedia* or *E. billardieri*)† and *Erica arborea alpina*.

The most important items would be the low-growing "mushroomy" evergreens, and if the presence of lime prevented the use of dwarf rhododendrons, one could have plants like *Berberis calliantha*, *B. candidula*, *Viburnum davidii*, *Daphne retusa* and *D. tangutica*, as well as the taller, and partly deciduous, *Daphne* × *burkwoodii*.

Granted fair shelter, *Ceanothus*, especially evergreen kinds such as *impressus*, *burkwoodii*, 'A. T. Johnson' and 'Delight', could be used, as these are undoubtedly the finest blue-flowered shrubs hardy in Great Britain (though *Caryopteris clandonensis* 'Heavenly Blue' is also fine).

Grey-foliaged shrubs such as *Senecio laxifolius*, *Cistus* 'Silver Pink' and *Halimium formosum*, apart from providing a lovely contrast to any dark green foliage, especially in winter, are usually very much at home in these snug, dry and sunny positions.

If the beds were large enough, herbaceous plants—paeonies, bearded irises, hardy agapanthus and the smaller kniphofias (Red-hot pokers) could be planted in between the shrubs. This would partly at least, overcome the objection, that in a small, modern, labour-saving garden, there is no room or scope for herbaceous plants.

On the shady side of the house, an entirely different set of shapely, and mainly evergreen, plants could be used—*Mahonia japonica*,* *Choisya ternata*,* camellias (remembering to keep pinks and reds separate, and to make far more use of whites than is generally done), skimmias,* sarcococcas* (sweet-box), especially *S. hookeriana digyna* and *S. humilis*, *Daphne blagayana*, *Viburnum burkwoodii** and dwarf evergreen azaleas like 'Hinomayo', 'Hinodegiri', 'Amoenum Coccineum', 'Macranthum', etc.

Herbaceous fillings could consist of hellebores, hardy ferns, cyclamen, particularly *C. orbiculatum* and its variety *coum*, × *atkinsii* and its var. *album*, *neapolitanum* and var. *album*. Geraniums, especially *grandiflorum alpinum* and *wallichianum* (Buxton's variety), hostas (Plantain lilies), mossy saxifrages and epimediums, etc.

If these beds were well mulched with peat, a garden such as this would need little maintenance except for grass cutting.

The grass and tree area, if found to be too bare and unfurnished, could be built up with a few deciduous shrubs, planted, say, under a

* All the plants marked with an asterisk are fragrant, and this applies also to the daphnes mentioned for the sunny beds.

† It is fair to point out that these evergreen eucryphias are only fit for fairly sheltered gardens.

group of cherries, or against the evergreen background of hollies or conifers.

Suitable shrubs would be deutzias or philadelphus whose mahogany-coloured stems, in winter, would show up beautifully against an evergreen background, or certain *Rosa* species, especially the *Spinosissima* group (Scotch Briars) and pale yellow-flowered kinds such as *R.* 'Canary Bird', *primula* and ×*cantabrigiensis*.

If a transitional area is felt to be necessary between the "park" and the beds by the house, one could plant one or two low trees or tree-like shrubs, e.g. shrubby magnolias like *liliflora nigra*, 'Brozzoni', 'Lennei', and 'Alba Superba', or *Acer japonicum* and its varieties. *Rhus cotinus* and its var. *foliis* purpureis, *Aesculus parviflora* and *A. mutabilis induta* (the last two being shrubby chestnuts of good shape, white and yellow-flowered respectively), or lower still, *Viburnum tomentosum mariesii* and tree-peonies, etc.

MASTERS MEMORIAL LECTURE, 1960

INSECTS AND HORTICULTURE

Professor H. W. Miles

(*Lecture given on October* 11, 1960; H. V. TAYLOR, C.B.E. D.SC., V.M.H., *in the Chair*)

PART I

THE CHAIRMAN: This year the Society has chosen PROFESSOR MILES to give the Masters' Lectures. PROFESSOR MILES is Professor of Horticulture in London University; he is also a skilled entomologist and so is specially equipped to deal with this subject.

PROF. MILES: The last time this Society considered the subject of insects, through the medium of the Masters' Memorial Lectures, was in 1928—over thirty years ago, and it is a pleasure to recall that DR. H. V. TAYLOR was Chairman on that occasion. I am sure that this long interval has nothing to do with the importance of the subject in the esteem of the Society, but may be related to the fact that many specialist groups have been formed within the Society who keep themselves well informed about insects and their control as it affects their special subject.

In 1928 the lecturer was PROFESSOR F. V. THEOBALD of Wye College. He was known to many members ot the Society and was a contributor to the Society's JOURNAL. In his Masters' Memorial Lecture he made reference to the valuable work of MISS ELEANOR ORMEROD on insect biology and paid tribute to SPENCER U. PICKERING of Woburn for his critical approach to insect control by chemical means.

MISS ORMEROD published a series of Annual Reports on injurious insects over twenty-four years from 1877 to 1901. She had the assistance of voluntary correspondents in many parts of the British Isles and she recorded a remarkably high proportion of the harmful species we know today. In his capacity as the teacher responsible for agricultural zoology at Wye, THEOBALD also published annual reports on injurious insects from 1896 to 1923. His reports overlapped MISS ORMEROD's and together these two workers have provided a most valuable record of insect activity covering half a century, and the official reports issued from the Board of Agriculture from 1917 onwards have continued the record.

INSECTS AS PESTS AT HOME AND OVERSEAS

That insects were nuisances in orchards and gardens was known from early times and writers such as "our honest LAWSON" (1616) as JOHN EVELYN later called him, listed the best-known orchard pests and gave practical instructions for reducing their numbers. Later writers including JOHN BEALE (1653) and LEONARD MEAGER (1670) briefly supplemented LAWSON's information.

One of the early *text-books* about insects as pests was that of VINCENT KÖLLAR published in Austria in 1837. Assisted by several acknowledged specialists, he gave good descriptions of the insects and details for their identification together with some instruction as to their control. There was no comparable book available in England except perhaps the wordy volumes by KIRBY and SPENCE, so JANE and MARY LOUDON translated it into English, and under the watchful eye of PROFESSOR J. O. WESTWOOD, added some illustrations and published it in 1840 (7).

KÖLLAR's book was of immediate interest in the United States where outbreaks of insects in fields, orchards and gardens, were at that time so serious as to attract public attention. At first, as in England, the Agricultural and Horticultural Societies, the only organized bodies concerned, offered prizes for essays on particularly troublesome species like the Hessian fly of wheat and the tent-caterpillars on their shade trees. Then individual States appointed entomologists with special responsibility for survey work on injurious insects. One of these, DR. THADDEUS W. HARRIS, was appointed by the Massachusetts Legislature as early as 1837 and we find him writing about the lackey moth in these words:

"The moths appear in great numbers in July; at this time they lay their eggs, selecting the wild cherry in preference to all other trees, and next to these apple trees the extensive introduction and great increase of which in this country, afford an abundant supply of food to the caterpillars. . . . These insects have obtained such notoriety among us that they are known almost exclusively as *the caterpillars* and are the worst enemies of the orchard."

It was natural that the American entomologists should turn to the European sources of information and KÖLLAR's book, with its frequent references to beneficial insects, was of value to them for he mentioned

the carabid beetle, *Calosoma sycophanta*, as voraciously devouring leaf-eating caterpillars. Continued insect outbreaks of unprecedented seriousness gave point to teaching and investigation in the United States and by 1860 entomology was taught as a college subject. In 1887 money was made available for the establishment of agricultural experimental stations in many of the States and thereafter entomological work proceeded rapidly. By that time MISS ORMEROD was publishing carefully documented and well-illustrated reports. They were in demand in America and Canada where she soon had many correspondents, including C. V. RILEY, of the U.S. Department of Agriculture, and W. SAUNDERS, Director of the Canadian's Government's Experimental Farms. Her reports on the insects injurious to fruit crops were of special interest because of the steady expansion of fruit-growing in U.S.A. and Canada, and also in Australia, New Zealand and South Africa.

Though the climate and the types of crops and culture differed widely in the several countries there was a large enough common element in the insect fauna to make experience in insect pest control in these regions relevant as between one country and another. Where the countries concerned grew the same crops, notably apples and pears, in much the same way, the value of the exchange of knowledge was very great. North America and Canada, South Africa, Australia and New Zealand grew commercial orchard fruit on the European pattern, but as the plantations were laid out in quite new environments they were subject to attack by native and introduced insects.

THE BEGINNINGS OF BIOLOGICAL CONTROL

The men doing educational work among fruit-growers in these new countries realized that the orchards in the old countries did not suffer serious losses from insect pests though the writings of ELEANOR ORMEROD, F. V. THEOBALD and others, showed that the pest species were present. This encouraged American entomologists to investigate more fully the part played by predaceous and parasitic insects in Europe and Australia in controlling those injurious insects that had been introduced into the U.S.A. They collected parasites and predators, and after screening them bred them and finally released them into the forests and orchards. Spectacular control of the fluted scale in citrus orchards was achieved by the introduction of the Australian lady-bird, *Novius cardinalis*. Later the European carabid beetle, *Calosoma sycophanta* was used with some success to control the gypsy and brown-tail moths in the Eastern States, work which continued into the early years of this century. It was not an easy task and before the carabid was finally released some thirty-seven species of parasite and predator were studied because all of them played a part in keeping the moths in check in Europe.

While the search for parasites and predators was going on demands increased, notably from Western American commercial fruit growers, for insecticides to control scale insects and codlin moth. One of the substances tested was lead arsenate, which proved especially useful against

the codlin moth and was also effective against leaf-eating caterpillars. Similarly, nicotine and related substances, were successfully used against aphids, suckers and plant bugs. Washes containing paraffin emulsion were still retained and some growers clung to an old practice of lime-washing the tree trunks in winter.

It was the overseas growers producing fruit for distant markets who first realized that only the best of their orchard fruit justified the cost of handling and shipment. Blemishes reduced its value and as insects and fungi were seen to be the principal causal agents it was against these that investigations were increasingly directed. As economic factors forced an increasing measure of co-operation on the overseas fruit growers, their pest control operations improved and became part of their routine practice, and the continuing demand for new knowledge of spray chemicals helped forward the development of the American interest in the manufacture of insecticides and gave them a lead which they still largely retain.

ORCHARD SPRAYING IN GREAT BRITAIN

In Great Britain, growers had the convenience of markets nearby. They grew a wide range of varieties and marketed ungraded fruit thus earning for themselves low prices and a bad reputation. After World War I, when orchards were more neglected than usual, and pests and diseases were prevalent, the better growers began to spray more regularly; they used the insecticides that were popular overseas. Demonstrations at county centres showed that lead arsenate and nicotine were satisfactory provided they were applied at the right time. With one application between the "cluster" stage and the opening of the blossoms, and another between petal fall and the closing of the calyx, a high degree of pest control was obtained. At the same time trials of sulphur and copper as fungicides, showed that they gave a good measure of disease control, and by adding insecticides to the fungicidal washes time and labour were saved and the use of mixed washes became customary.

An advance was made in the early 1920s with the introduction of the tar-oil winter wash. A substance of this type had been used in the United States on willows and was then being increasingly used in Holland on fruit trees. Early trials at Long Ashton showed that emulsified tar-oil killed overwintering eggs, and sprayed trees produced vigorous foliage and remarkably clean fruit and many commercial growers who had never previously used a spray began to use a tar-oil winter wash. That was the position when THEOBALD addressed this Society and reported that fruit-growers had gained much from the introduction of tar-oil washes, for they provided a means of controlling some of the most serious pests of fruit in the egg stage in winter and in certain cases they rendered summer spraying with insecticides unnecessary. Some figures published at that time (10) showed that, on the basis of trials in six commercial orchards a good tar-oil wash gave 87–97 per cent control of aphids and apple sucker, and 68–84 per cent control of winter moth caterpillars,

and that 85–87 per cent of clean fruit was produced as against 76 per cent from unsprayed plots. THEOBALD pointed out that the tar-oil washes were useless against the fruit tree red spider and unreliable against the apple capsid bug, and that apple blossom weevil and the big bud mite of blackcurrants were outside the scope of the tar-oil washes. At that time, however, A. M. MASSEE was achieving considerable success with lime-sulphur against the mites at East Malling and work at Long Ashton had endorsed the value of trapping and orchard hygiene against the weevils (13).

THE DETAILS OF INSECT BIOLOGY

By the early years of this century it had been accepted that the study of an insect's biology and behaviour was necessary if it was to be attacked intelligently at some weak point by appropriate direct or indirect means. THEOBALD wrote in 1909, "The life history of an insect, mite or worm seems a trivial matter, yet it is upon the knowledge of such matters that we must rely if we wish to fight this wonderful Nature. Unfortunately we can lay no claim to complete, or anything like complete knowledge even of the best known of fruit pests. Any one of these may form a life-long study and even then we are far from the end." This was well instanced by the example of the apple blossom weevil already mentioned. KÖLLAR had given a remarkably full account of it in 1837, yet ninety years later it was still a major pest against which the elementary method of trapping seemed the best that could be devised. It was appreciated that trapping and orchard hygiene were but stop-gap procedures to be used only until effective chemical means of control could be discovered.

Other insecticides available for most of THEOBALD's time were quassia, pyrethrum, nicotine and lead arsenate, and at the time of his lecture, derris and paraffin in the form of white oil emulsion had been introduced and were beginning to be used in orchards, notably against the red fruit tree spider mite.

THE SPRAY PROGRAMME

At that time it was generally assumed, at any rate in practice, that a fruit plantation was a more or less isolated unit where something approaching the complete destruction of harmful species of insects and mites was desirable, and, given appropriate insecticides possible. Between the two great wars therefore, the staffs of fruit research stations at home and abroad developed spray programmes designed to eliminate the major fruit pests and diseases. The programmes were comprehensive and precise in the detailed instructions they contained; and because they had been developed by official scientists they were accepted at once by progressive growers, and adopted without question by the less progressive. The spray programmes were idealistic and aimed at producing 100 per cent clean fruit in apple and pear orchards, and their adoption implied that all the pests listed might occur every year in every plantation.

The basis of the insect and mite control programme was the tar-oil winter-wash, followed at appropriate growth stages by washes containing nicotine, lead arsenate and derris. Where these could be applied as mixtures, or be combined with lime-sulphur for disease control, a desirable economy was achieved, but no one investigated the economic aspect of the procedure, and there is little information on the extent to which full or modified programmes were adopted. Spray programmes based on official recommendations were used by specialist fruit growers and the "freedom from blemish" standard of the exhibits of home-grown fruit in Britain was high. In the early 1930s by the use of one of the recommended programmes a grower of orchard fruit might be expected to secure over 90 per cent control of aphids and apple suckers, 70–80 per cent control of capsids, over 90 per cent control of the caterpillars of winter moth and allied species and some 60–70 per cent control of tortrix moths. Codlin moth and apple sawfly were acknowledged as more difficult to control, but, even with these, 60–80 per cent control was possible and there might be some reduction in injury caused by apple blossom weevil.

Later, as more accurate methods of assessing the results of experiments were developed it appeared that growers were working with extremely inefficient spraying apparatus, in orchards laid out long before convenience in pest control was a factor to be taken into account, and in fact the sprays were destroying considerably less than 100 per cent of the insect pest numbers present.

FURTHER PROBLEMS AND THE GROWTH OF KNOWLEDGE

The problem of the fruit tree red spider mite remained despite the use of lime-sulphur, a recognized acaricide, but the intensity of attack was variable and its distribution was erratic. The heaviest infestations were experienced in the south-east of England and some notably serious attacks were seen in orchards where the tar-oil winter wash was the only insecticide used. This latter point was disturbing and, as was eventually seen, it represented the first example of an upset to the orchard fauna to be recognized in this country. MASSEE showed conclusively that the upsurge of red spider after the use of tar oil wash was caused by the destruction of insect predators, notably the Anthocorid bugs.

In 1937 A. M. MASSEE's book* on the insect pests of fruit and hops appeared and this placed in growers' hands an up-to-date account of the important species that were likely to occur anywhere in Great Britain. The numerous illustrations greatly assisted field identification, and the biological and control details together with references, enabled growers and advisors to learn the essentials about specific pests and where necessary to follow this with further reading. There is no doubt that MASSEE's book proved of immediate service and became even more valuable two years later when war led to the demand for more productive orchards using less labour. By 1937 over 100 species of insects and mites were recognized as harmful or potentially harmful to our apple

* *The Pests of Fruits and Hops*. Crosby Lockwood, London.

crop and about half this number to pears, plums and strawberries. Raspberries, currants and gooseberries also had appreciable numbers of enemies some of which, like the raspberry fruit beetle (*Bytarus tomentosus*), the big-bud mite of blackcurrant, and the common gooseberry sawfly, were persistant nuisances, in spite of the fact that apparently good control measures were in regular use. A list of the major groups of pests of fruit crops at the time is given in Table 1.

TABLE 1

	Species of					
Crop	Beetles and Weevils	Moths	Sawflies	Aphids, Thrips, Capsid, Scales	Others, e.g. Flies, Earwigs, Mites, Eelworms	Total Species
Apple	21	52	2	21	8	104
Pear	11	18	4	14	7	54
Plum	9	24	4	16	6	59
Strawberry	22	3	2	11	10	48
Raspberry	10	9	3	7	6	35
Currants	1	6	2	14	6	29
Gooseberry	1	5	3	11	5	25

Two questions began to interest entomologists in England at that time: first how a few applications of a very general insecticide could give such apparently good results when there were so many potential pests present in our orchards and fruit plantations; and second, why did fruit growers in Canada, Australia, New Zealand, and South Africa have to do so much spraying and, relative to this, why had American fruit growers recently failed to control codlin moth with several applications of lead arsenate, when formerly they claimed great success with this substance?

About this time, 1939, DR. V. B. WIGGLESWORTH* published the collected results of his researches into insect physiology, which showed that a knowledge of the physiology notably of hatching, moulting and diapause of a harmful species is vitally necessary whether direct means of control are to be applied or whether the environment is to be modified. He also emphasized that anatomical peculiarities, physiological responses and ecological specializations of insects were interdependent and that economic entomologists should be prepared to study all these facets of their subject. WIGGLESWORTH's book came at an opportune time and stimulated work in universities and research stations, and in the field, where during the war, more effective scientific and practical guidance was provided through the augmented staffs of the Ministry of Agriculture.

* *The Principles of Insect Physiology*. Methuen, London.

THE WAR YEARS AND DDT

During the war the entomological aspect of crop protection was greatly influenced, and, in part, directed by the late SIR JOHN FRYER, F.R.S., whose extensive knowledge of insects in the field enabled him to appreciate the validity of the claims for the recognition of physiology and ecology, that WIGGLESWORTH and others were so strongly urging. The result was that more precise methods were adopted for the testing of insecticidal efficiency and more attention was paid to the details of mixing, handling and application of sprays and to the economics of orchard spraying. FISHER's work at Rothamsted and Cambridge now resulted in the development of better techniques for assessing insect numbers and damage and the results of experiments.

While the responsibility for new investigations was taken by the fruit research stations, useful supplementary work was carried out by entomologists in the official advisory service and by the members of the county staffs who supervised contract spraying or actually did the work themselves. In response to the demand for greater immediate effectiveness research stations began to produce biological material for use in the new methods of testing insecticides as for instance, the production of stocks or maiden trees for deposition of eggs of aphids and spider mites. With standard lengths of such twigs carrying known densities of eggs of reasonably uniform provenance, biochemists could proceed to a critical assessment of insecticidal qualities and physiologists could investigate the mode of action of substances under test. At this time also schemes were put forward for recording insect populations year by year so that forecasts of insect outbreaks might be made.

All this work was in progress when a new insecticide was introduced into this country from Switzerland. I refer to the synthetic substance DDT used tentatively in 1942, but established by September 1944 when MR. WINSTON CHURCHILL stated, "The excellent DDT powder which has been fully experimented with and found to yield astonishing results, will henceforth be used on a great scale". The Prime Minister was right! DDT was used on a great scale and became the first of a series of synthetic insecticides that have revolutionized pest control throughout the world.

MARTIN and WAIN (8) at Long Ashton reported fully in 1944 on the properties of DDT as an internal poison and as a contact insecticide, and showed that it was compatible with lime-sulphur and Bordeaux mixture in combined sprays and retained its effectiveness in the presence of petroleum sprays. From this time onwards DDT and BHC, a substance with somewhat similar properties, were used increasingly by fruit growers; they combined well with the popular fungicides and lasted much longer than the insecticidal substances previously used. Experience showed that DDT was an extremely effective insecticide and that it acted in the orchard as MARTIN and WAIN had predicted.

Remarkable killing of caterpillars of all kinds was demonstrated; aphids and capsid bugs were destroyed, so too were more difficult pests like apple sawfly and apple blossom weevil. Indeed Dicker (3), was able to write from East Malling, that thanks to DDT there was now no need for anyone who grew fruit to suffer loss from the depredations of apple blossom weevil for all that was necessary was to add 0·1 per cent of DDT to a winter wash used in February, or even less for an application in March.

This was most encouraging. Here at last was an efficient and versatile insecticide capable of killing the major fruit pests. It had only to be added to other washes, particularly to the two or three fungicidal washes that growers found it necessary to use and the orchard pest problems would be solved.

In the ten years, 1945–56, a remarkably high level of insect control was obtained in fruit plantations because thanks largely to the work of H. G. H. KEARNS of Long Ashton, spraying machinery was greatly improved (6). DDT gave good results wherever it was employed and orchard observations confirmed the laboratory conclusions on its efficiency as an insecticide and furnished further evidence of its persistence. The major orchard pests, with one notable exception, were strikingly suppressed and a high degree of pest control was obtained.

THE FRUIT TREE RED SPIDER MITE—STILL A PROBLEM

The exception was the fruit tree red spider mite. Infestation by this pest, as MASSEE reported and others observed, now reached levels seldom, if ever, seen in the major fruit-growing areas of Great Britain. At first it was difficult to believe that this was a biological side-effect associated with the use of DDT, but confirmation soon came from overseas (11). Entomologists and growers were again confronted with a very complex problem.

A full investigation was undertaken sponsored by the Agricultural Research Council, the Pettar Society of Insecticide Manufacturers and the Ace Fruit Growers' Association. Field work was begun in Essex to supplement that at East Malling and elsewhere and it was soon ascertained that there was a direct relationship between the use of DDT and BHC and the significant increase in fruit tree red spider mite population. The reasons were not far to seek. DDT and BHC had destroyed the predators of the mite which was itself tolerant of the insecticides and when released from the pressure of their predators the mites had multiplied at an astonishing rate, rapidly draining the foliage of moisture and nutrients and inducing premature leaf-fall and undernourished buds incapable of producing a normal crop of fruit the following year. MASSEE and his co-workers then made a full study of the effective orchard fauna and their careful work demonstrated that besides the injurious insects there was a diverse assembly of parasites, predators, pollinators and scavengers, whose habits were intricately related to the presence of the injurious species. Together they established a balance not

Photos: J. E. Downward

FIG. 1—A magnificent plant of Begonia 'Elatior Rood' which received the Award of Merit when shown by the County Borough of Brighton Parks and Gardens Department on October 25, 1960 (see p. 36)

Photo: G. S. Thomas

FIG. 2—A border at Kiftsgate Court, showing the value of foliage and contrasting forms, and containing both shrubs and herbaceous plants such as eremurus and foliage plants such as rodgersias, hostas and grasses (see p. 9)

Photo: G. S. Thomas

FIG. 3—The Glade at Bulkeley Mill, the columnar *Cupressus sempervirens* is interplanted with shrubs of rounded form such as *Rhododendron oreodoxa*. The creamy white bark of *Betula mandschurica*, which is planted in the grass, shows up well against the foliage of shrubs (see p. 11)

Photo: J. E. Downward

FIG. 4—The Lake at Sheffield Park. Not only do the silver stems of the birch frame the view, but they themselves are shown up by the dark green of Cypresses in the background and the brilliance of the autumn colour

(see p. 11)

Photo: P. David

FIG. 5—A sunny bank at Penjerrick in Cornwall on which dwarfer growing shrubs of diverse form and shape are planted which would provide interest throughout the year (see p. 10)

Photo: P. David

FIG. 6—*Prunus serrula tibetica* with bark like polished mahogany is of interest all the year round (see p. 11)

Photo: J. E. Downward

FIG. 7—Tintinhull where a number of small areas have been created most effectively within the main area (see p. 9)

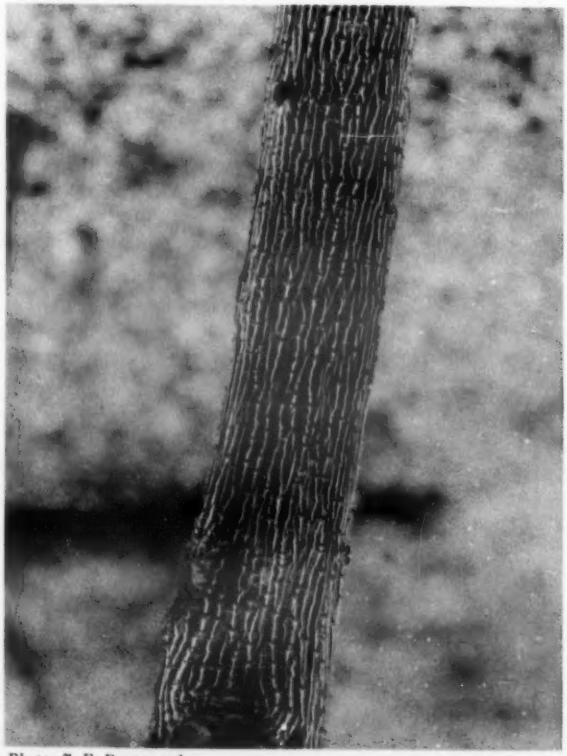


Photo: J. E. Downward

FIG. 8—*Acer davidii*, a snake-barked maple of much interest and beauty (see p. 11)

Photo: L. Hugh Newman

FIG. 9—A fine specimen of *Eucalyptus cinerea* in flower in the woodland at Tresco Abbey, Isles of Scilly (see p. 41)

Photo: J. E. Downward

FIG. 10—A one-year-old seedling Violetta, raised from selected seed, showing the compact growth and profusion of sweet-scented flowers characteristic of the strain

Photo: J. E. Downward

FIG. 11—Violetta 'Tom Tit'; a plant left in position for two seasons, showing the circular-shaped tuft of foliage with fragrant blossoms, freely borne, poised erect on dainty footstalks

These photographs complement the article and pictures by Mr. Howard H. Crane and published in the July 1960 issue of the *Journal*, pp. 321–5

easily upset by the routine use of mild insecticides but violently disturbed by the frequent use of persistent insecticides of high toxicity like DDT and BHC.

It took about ten years of patient work for MASSEE (9) and his collaborators to complete the story of the red spider mite and its predators and all the time they were revealing the need for further ecological investigations, They recorded at least seventy predaceous species from apple trees and showed that bugs, beetles, thrips, lacewings, flies, mites and spiders were seasonally present in fruit plantations. Of these the Anthocorid bugs and black-kneed capsids were shown to be highly effective as predators upon the fruit tree red spider mites. This demonstrated to English growers the value of natural biological control in orchards.

DR. COLLYER pronounced upon the predator situation in these terms (1) "the routine winter washes, tar-oil and DNC-petroleum do not affect the overwintering eggs of the black-kneed capsid—but they do kill many overwintering Anthocorids, ladybirds and Coniopterygids . . . When used in spring and summer, DDT and BHC kill them all, though adult Anthocorids and the ladybirds, in all stages, are least affected." She also stated the lime-sulphur and nicotine, in routine applications, do not greatly affect the predators and that, though derris has a temporary effect, it does not give the complete kill of predators that is so characteristic of the synthetic substances. Many growers then followed the guidance of MASSEE and COLLYER and modified their spray programmes so as to avoid using persistent insecticides in summer and thus to safeguard as far as possible the beneficial species.

It was unfortunate that before this good advice could be widely used a new range of substances, the organo-phosphorus insecticides, such as parathion and metasystox, were introduced. These killed off the summer predators of the fruit tree red spider mite but did not completely destroy the mites which again multiplied with remarkable speed and seriously affected the foliage in late summer. Now, with the persistent substances like DDT and BHC destroying predators and parasites in early summer and the organo-phosphorus substances acting powerfully against the main summer predators, the task of finding a workable solution to the problem of the mites has become exceedingly difficult.

There is no doubt that we have powerful insecticides available for pest control but their use is fraught with the real danger of upsetting the faunal balance in the orchards in which they are used, not only in England, but also on the American continent, particularly in the New England States (4 and 5) and Eastern Canada, where long addiction to the use of insecticides has created conditions least favourable to the operations of biological control. In Nova Scotia A. D. PICKETT (11) and his colleagues showed that synthetic insecticides applied by means of efficient modern machinery have, by killing the predators and parasites brought about a situation where 6–10 applications of insecticide are required annually to produce crops reasonably free from insect damage.

INSECT RESISTANCE TO INSECTICIDES

The disturbing of the faunal balance is only one aspect of the entomological tangle. Now I turn to the failure of lead arsenate to control codlin moth in the United States even after six or more applications, whereas in England good control is obtained with one or two well-timed applications. Though puzzling at first, it was soon apparent that the repeated and continuous use of lead arsenate by exposing a large proportion of the local codlin moth population to the effects of arsenic-contaminated food, had killed all the caterpillars whose metabolism was highly sensitive to arsenic poisoning and left unaffected a small number of caterpillars able to tolerate arsenic in their diet. These caterpillars became moths and reproduced, and gradually, in an environment that favoured three or more generations a year, arsenic-tolerant individuals predominated and were largely unaffected by the use of lead arsenate sprays at the usual rates of application. Thus in the U.S.A. the ability of phytophagous insects to build up resistance to specific chemical insecticides was definitely established. Henceforth growers and applied entomologists alike were to be constantly confronted with these two phenomena, resistance on the one hand and biological unbalance on the other. That virtually is the position today though now it is recognized that "resistance" in insects is by no means understood and that the biological balance is more subtle and complex than most of us realize.

The difficulty of controlling fruit tree red spider mite remains, for acaricides like Ovotran, Tedion, etc., are unreliable and the organophosphorus insecticides have brought a serious mammalian toxicity hazard into orchard spraying.

Fruit growers today act on the best available scientific guidance and in general they obtain a commendable degree of pest control at a high cost, producing fruit with an attractive finish free from blemishes caused by insects. They use dangerous insecticidal materials but safer alternatives would be preferred if they were available and their efficiency was established. With modern insecticides and up-to-date spraying equipment a complete control of most of the insects can be secured for at least a season, but the red spider mite is still a problem in many orchards despite the fact that there are ten or more substances available for its destruction (2). SIR JOHN RUSSELL (12) said recently, "The almost limitless number of variations on any chemical type that can be synthesized, means that the task of testing them is endless". This statement applies to the initial tests in the laboratory. Orchard tests of insecticides and acaricides are even more difficult because they can only be carried out at certain times of the year and must be repeated for several seasons in order to take account of seasonal fluctuations in the fauna and the weather.

Fortunately for English fruit growers the biological balance of their orchards has not been violently or permanently upset except in the case of the fruit tree red spider, nor has the use of highly toxic chemical sub-

stances resulted in the development of resistant strains of orchard pests. This is largely the result of the comparatively small scale of our fruit-growing industry and its dispersal and integration with the other agricultural and horticultural enterprises, and also to the fact that our range of orchard pests is small. Local disturbances to the biological balance largely correct themselves when the spray procedure is suitably modified. The official advisory services and the fruit research stations now have a good deal of experience in these matters and can give valuable advice on the selection and use of insecticides and acaricides for these difficult situations.

More ecological studies of the orchard fauna are necessary. East Malling has made a successful beginning that should be actively developed and widened to cover all the orchard insects. Perhaps parallel studies could be carried out at Long Ashton and at a Northern station because the differences in climatic and related conditions would help to emphasize the importance of these factors. If I sense correctly, the feeling of entomologists concerned with fruit pests, it is that just as in the old days the indirect measures were regarded as stop-gaps until chemical control could be developed, so now the excessive reliance on highly toxic chemical substances should be regarded as a temporary phase pending the accumulation of more complete biological and ecological knowledge.

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THE CHAIRMAN: I am sure you would all like me to thank PROFESSOR MILES for his most interesting lecture and for showing such beautiful slides.

I was delighted to hear him constantly referring to biological balance and biological control because up till now the brains of the entomologists seem to have been devoted almost wholly to finding chemicals to kill the pests.

PROFESSOR MILES is anxious to use these potent and very dangerous chemicals so that they do not upset biological control and the biological balance, but leave the other beneficial insects alone to do the job which they do for us.

DR. MASSEE: PROFESSOR MILES mentioned that before the war entomologists and fruit growers were surprised that the so-called "omnibus"

sprays of 1937-9, consisting of lead arsenate, nicotine and lime-sulphur gave such good control of many of our fruit insects. I think the explanation was that that particular programme was effective in reducing, but not annihilating the pests concerned, but reducing them below pest level until the next application was due to be applied. This treatment doubtless destroyed some beneficial insects, but many survived. In pre-war days one could visit an orchard at any period during the spring and summer months and find large numbers of beneficial insects in sprayed orchards—here beneficial insects were helping to keep down the number of pest species which remained in the trees following the spray application. In practice we got good direct control combined with natural control.

It is interesting to note that a few faithful fruit growers still obtain a good living by using the pre-war programme, and never use the synthetic chemicals available today.

Where phosphorus chemicals are used, I am thinking of a ten-acre orchard near my house, of 'Bramley's' and 'Newton Wonder'; the absence of insects including pests, beneficial and neutral species is so marked during the blossom period that it is like walking into a mortuary.

By the middle of July, however, large populations of the fruit tree red spider mites build up, and still more phosphorus chemicals are used to try and control this serious pest.

I think the danger is in the fact that if you follow a programme like that for a number of years, the beneficial insects in the orchard are wiped out, and the true parasitic insects which visit the orchard from neighbouring hedgerows and woodlands are destroyed also. It may not happen in my time but there may come a time when there are no true parasites left to come in, and then the position may indeed be desperate.

I do not think we can abandon the use of chemicals for pest control, that would be an entirely wrong conception of the position, but we must harmonize natural control with the use of chemicals, in order that we can safeguard our beneficial insects, the neutral insects and in particular the pollinating insects on which so much depends.

In the meanwhile we must hope that DR. DICKER's programme of work at East Malling of trying to harmonize the use of beneficial insects with his harmful chemicals for pest control will prove successful.

I should like to conclude by thanking PROFESSOR MILES for his lecture.

THE CHAIRMAN: Well, Ladies and Gentlemen, our time is up, and it only remains for me to ask you to show your appreciation to PROFESSOR MILES in the usual manner (*Applause.*)

WINTER PROTECTION OF TENDER GARDEN PLANTS

B. P. Tompsett

My garden in the Kentish High Weald is sheltered from the north and east and has good "frost drainage", but this district certainly cannot be regarded as one of the mild and favoured areas of our country.

It is the first of November; after the long summer days of activity the time has come to spend an evening in checking the list of plants in my garden which, though generally reasonably hardy, will need winter protection, and deciding what form this shall take. It is especially necessary to provide protection this winter as the majority of less hardy plants are in no state to face a severe spell of weather. After the wet summer and long, wet and mild autumn plants are in a soft condition, shrubs have made much soft sappy growth (instead of the hard, well-ripened wood we like to see) due to the high nitrogen conditions this summer; the carbon-nitrogen ratio is an important one in relation to winter hardiness. We cannot control the climate which has given us these high nitrogen conditions, but for the future we can make sure that there is adequate potash available—the balancer against nitrogen. Hardiness can be encouraged by a balanced nutrition. It is often necessary, when applying potash, to apply magnesium, as so many garden soils are deficient—this is easiest applied as magnesium sulphate (Epsom salts). This can be applied at any time during the winter so that it is washed in and becomes available to the plant during the spring. Potash would be best applied in the form of Sulphate of Potash and the same remarks apply. In the case of both materials the quantity required varies, of course, with the degree of deficiency present. An application at the rate of 2 cwt. per acre (approx. 1½ oz. per sq. yard) is desirable and if deficiency is known to exist, as shown by plant symptoms, this can be continued as a routine dressing for four or five years. Otherwise, as a rough guide, the above dressing can be applied every other year. These are only generalizations as, of course, the requirements of each group of plants varies, but the majority require normal balanced conditions. An excessive application of potash will induce or aggravate a magnesium deficiency, so too heavy applications should be avoided. Of the two plant nutrients potash is the most likely to be short. The heavier loams and clays are usually naturally fairly well supplied with potash. Balanced nutrition also helps plants to resist, and grow away from, the attacks of some diseases and pests. This year, we in the south-east have lost our compensatory advantage over gardeners in the much milder south-west. The drier climate we usually enjoy, especially in the late summer and autumn, conditions the plants for the winter. Consequently our gardens normally stand up to much lower winter temperatures.

As with our children, we owe our plants a duty to help them to stand up to life's rigours. We selected their environment and, although we could not give the exotics the warmth and sunshine of their native habitat, upon how wisely and carefully we have chosen their site and on what protection we give may depend their lives this winter.

The protective materials we select must give a high degree of insulation by providing many little air pockets which must not be lost by decomposition during the winter or the insulating properties will be lost. There is also another disadvantage in using materials which are liable to rot down quickly where the ground is wet and heavy. Under these conditions any material which aggravates the anaerobic state can cause harm, the bacteria which rot it down robbing the soil of oxygen in so doing. Under conditions of free drainage, however, this will not occur. For the plants' health we must permit some air circulation. The materials I find best are (*a*) bracken, heather, pine needles (all three have the virtue of drying out rapidly); (*b*) ashes; (*c*) sacking. Bracken is ideal and can be used either full length or chopped up according to the size of plant. Place it round the plant and, if suitable to the type of plant, also give a light covering over. Certain small shrubs can often be cut back and tidied to make them compact before covering. It is inadvisable, however, completely to cover evergreens. To prevent scattering by wind and birds, a few twigs or small branches can be placed in the ground or even wire netting used as a cage. These materials can provide ideal homes for slugs and therefore any plants which can be damaged by these pests must be protected with slug killer. Ashes can be used for protecting bulbous plants and certain tender herbaceous subjects which disappear underground each winter, remembering always that ashes are usually acid. Coal ash should first be weathered. I place ashes about 6 inches deep heaped up round the plants to be protected.

Sacking I find most suitable for protecting the stems of shrubs and trees. With the latter the sacking should also protect the crotch then even if the branch-work is killed we can rebuild a new head. Tie the sacking loosely round the stem and crotch or, with small trees and shrubs, enclose the whole inside a large sack and tie to three stakes placed round the plant. If the sacks have contained chemical manure or other material injurious to plant tissue they must first be well washed or severe damage will result.

Low temperatures can be greatly aggravated by a cutting wind. Apart from the permanent shelter provided by trees, hedges and walls, protection can be given by the use of wattle hurdles. Small plants can be guarded with an upturned flower-pot—which is also a most useful protection against heat and drying-out when moving a plant in summer.

The trees, shrubs and herbaceous subjects to which I shall give this protection (although some of them already have the shelter of a wall) are: *Acacia dealbata*; *Camellia reticulata*; *Carpenteria californica*; *Caryopteris clandonensis*; *Convolvulus cneorum*; *Desfontainia spinosa*; *Embothrium coccineum lanceolatum*; *Fremontia californica*; fuschias;

leptospermums; *Metrosideros tomentosa* and *M. lucida*; olearias; *Pieris forrestii*; *Romneya coulteri*; *Solanum crispum*; *Crinodendron* (*Tricuspidaria*) *hookerianum*; Veronica 'Alice Amherst' and V. 'Blue Gem'; and a young *Pinus patula*. *Agapanthus umbellatus*; *Agave parryi*; *Crinum powellii*; *Cardiocrinum giganteum*; tigridias; and *Watsonia meriana*.

With certain plants such as *Lobelia cardinalis* and *L. fulgens* and the choice and tender varieties of mimulus, I make a practice of wintering a proportion in the cold frame, so as to ensure a stock with which to commence the following year.

There are plants whose own leaves can be used to form a protection by placing them over the crowns, such as *Gunnera manicata*.

There are many other shrubs to which I do not give special protection in winter but which were carefully sited in the first place, for example: *Abutilon vitifolium*; *Arbutos unedo*; Camellia 'Cornish Snow'; most of the ceanothus; *Ceratostigma willmottianum*; *Choisya ternata*; some of the tender cistus; *Cornus nuttallii*; *Cytisus battandieri*; *Daphne odora*; escallonias; *Eucryphia nymanensis*; *Hydrangea quercifolia*, *H. sargentiana*, and *H. serrata* 'Grayswood'; *Lavatera olbia*; *Mahonia lomariifolia*; *Phlomis fruticosa*; *Senecio laxifolius*; and some of the magnolias and eucalyptus, and *Phormium tenax*, although all these, and many others, I protect until they are well established. I always refer to the R.H.S. Rhododendron Handbook for information as to the hardiness of rhododendron species and hybrids. I am planting this year a collection of eremuri and shall protect the beds with a scattering of bracken if the weather is severe. It should not be necessary to continue this once they are established.

The chief danger after such a year as 1960 is an early and sudden cold snap and if we can protect plants against this it will assist them to continue properly into their dormant state. With most plants this period is, in fact, much shorter than is often supposed—varying but, generally speaking, about seven weeks. The root is quite active during most of the dormant period, the chemistry of the plant going on with a high degree of complexity during the winter. It places the importance of the well-being of the roots in proper perspective when one remembers that over half of the plant is underground. Below 1 foot the temperature of the soil changes very little in this country. If our plants are to perform their proper functions—closing their accounts for this year and opening for the next—we must supply them, as far as possible, with reasonably congenial and favourable circumstances in which to do so.

Remove all protective material in March when fear of severe frost has passed or earlier if the winter proves mild, as in mild, wet conditions the cover can be conducive to the development of fungoid diseases.

Here may we consider the various factors which predispose plants to winter injury, having already touched on nutrition.

It is good to enjoy a southern aspect which may give good protection from wind-borne frosts and strong winds which produce a high rate of

evaporation, but there is still the hazard of radiation frosts. Good katabatics are obviously important. If the site happens to be in a valley, a small depression (frost pocket) or, in cases where the ground falls away, if the gradient is obstructed by a wall, hedge, or any other object which impedes the gravitation of frost-laden air down the slope, the damaging cold air cannot get away and long periods of frost will result causing severe damage to the plant cells. We must avoid such positions when siting tender subjects. It is now generally understood that cold air—in the absence of wind—flows downwards like water and settles at the lowest point. The flow is easily impeded, in a valley or behind an obstruction the cold air builds up in depth. It is often possible to improve the situation by removing the obstacle. A problem is sometimes met when this happens to be a useful windbreak; in this case it is best to cut a path for the cold air through that part which is least necessary, at a low point.

The protection which the overhead branches of deciduous trees provide against radiation frost is considerable and is welcomed by many shrubs, even by some of those not commonly regarded as shade-loving, provided the cover is not dense.

The type of soil also has a large bearing on hardiness. Unless the plant has a healthy and efficient root system it is not able to withstand adverse conditions above ground. Roots must have air to breathe and function properly and it must be possible for the air to move freely in the soil or the plant's ability to stand a severe winter will be reduced. This does not rule out the heavier soils, but with these it is necessary to improve them by the addition of humus and even the provision of artificial drainage to take away surplus soil moisture. The provision of this is not usually very difficult but it is often "funked". It is only necessary to place rubble or land drainpipes at the bottom of a trench which will lead the water away to a ditch or natural outlet. Two things to remember are (*a*) the bottom of the trench must be carefully graded so that the water is not impeded as it flows away and (*b*) the drain must be deep enough, a minimum of 2 feet, so that the plant may have sufficient drained soil to accommodate its roots. It is advantageous to fill back the trench with lighter, porous soil. In this part of the country soil usually reaches field capacity about February following the winter rains. This year, however, we reached saturation point early in October.

I tidy up and remove decayed foliage from plants which dislike wet conditions, such as kniphofias, yuccas, crinums, etc., so that air can circulate and keep the base of the plants dry.

With the above thoughts in mind I shall do what I can to protect my plants, although in most years such thorough precautions may prove unnecessary, but it is important to be prepared especially after such a summer and autumn as we have just passed through.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1960

ORCHIDS

Aranda Wendy Scott 'Blue Bird' A.M. May 23, 1960. The parents of this cultivar are *Arachnis hookeriana* × *Vanda* Rothschildiana. A cut spike of sixteen fully developed flowers, each measuring 2½ inches by 1¾ inches was shown. The tepals were narrow, pale cattleya mauve in colour, with a small, deep maroon labellum. Shown by Mr. Boey Chun Heng, 282A Balestier Road, Singapore, 12.

Cymbidium Appleby 'Flakebridge' A.M. March 8, 1960. This fine cultivar was obtained by crossing *C.* Marcia and *C.* Babylon 'Castle Hill'. It carried a spike of six well developed flowers measuring 3½ inches across. The tepals were cream coloured suffused with pale rose; the labellum was oval shaped, white margined with rosy-mauve, and a number of crimson lines and blotches. Shown by Lord Hothfield, Castle Hill, Englefield Green, Egham, Surrey.

Cymbidium Lady Moxham 'Mont Millais' A.M. May 3, 1960. The parentage is *C.* Alexanderi 'Westonbirt' × *C.* Sunrise 'F. K. Sander'. A cut spike was shown with five well developed flowers measuring 4¼ inches by 3¼ inches. The basic colour is cream flushed with rose, and the edges of the tepals overlaid with bright yellow. The cream labellum is strongly recurved and is sparsely marked with crimson near the lower margin and has a central line of crimson. A yellow crest is present in the middle of the throat. Exhibited by E. Young, Esq., Mount Millais, St. Helier, Jersey.

Cymbidium Neville Chamberlain 'Majestic' A.M. March 8, 1960. The parentage of this hybrid is *C.* Louis Sander × *C.* Alexanderi 'Westonbirt'. The plant shown carried a spike of six fully developed flowers measuring 4½ inches across. The tepals were white with a faint rose-pink flushing; the labellum was white with crimson lines and spots, and yellow crest in the throat. Shown by Messrs. Armstrong and Brown, Orchidhurst, Tunbridge Wells, Kent.

Cymbidium Nicky 'Fragrance' A.M. March 22, 1960. *C.* Erica Sander and *C.* Radak are the parents of this greenish yellow cultivar. The plant shown carried a spike of twelve flowers, natural spread 4½ inches, tepal 1 inch wide. The bright greenish yellow flowers had a slight rose flushing and were exceptionally fragrant. The large labellum was open, with prominent side lobes, cream coloured on the inside, and on the outer surfaces with crimson markings towards the apex. Exhibited by Lt.-Col. F. E. Griggs, Pine Close, Borough Green, Kent.

Cymbidium Runnymede 'J. M. Clayton' A.M. March 22, 1960. Plant exhibited produced a fine spike of fifteen flowers, measuring 4½ inches across, tepal width 1⅜ inches; each flower was well spaced. The parents are *C.* Babylon 'Castle Hill' and *C.* Roxana 'Castle Hill'.

Basic colour creamy yellow with rose flushing. The large oval labellum was cream coloured marked with broken crimson lines. The lower portion of the labellum has an undulating margin and slightly reflexed apex. Exhibited by Lord Hothfield, Castle Hill, Englefield Green, Egham, Surrey.

Cymbidium San Francisco 'Meadow Mist' A.M. April 20, 1960. The parents of this cultivar are *C.* Blue Smoke × *C.* Balkis 'Silver Orb'. A fine spike of fifteen fully developed flowers was shown. The individual flowers of this fine American hybrid measured 4 inches by 4 inches; white shaded with a delicate shade of green and the edges of the tepals suffused with light rose. The large heart-shaped labellum was spotted with red around the margin, the crest was golden yellow, and the column was speckled with small red spots. Exhibited by Mr. Fred Stuart, 8606 E. Las Tunis Drive, San Gabriel California, U.S.A.

Cymbidium Sunglow 'Peach Blossom' A.M. April 20, 1960. *C.* Pauwelsii 'Comte d'Hemptinne' × *C.* Neville Chamberlain are the parents of this rose coloured cultivar. The spike carried seven fully developed flowers, each measuring 4 inches by 4 inches. The basic colouring of the tepals was rose covered with rosy-mauve intensified near the margins. The margin of the labellum was slightly undulated, rose-mauve which deepened near the margin, and irregularly lined and spotted with crimson from the yellow crest. Exhibited by Messrs. Armstrong & Brown, Sandhurst Park, Tunbridge Wells, Kent.

Cypripedium Cockade 'Chilton' A.M. January 26, 1960. The parentage of this fine-shaped, spotted cultivar is *C.* Ernest E. Platt × *C.* Allure. The large dorsal has a green centre spotted with large brownish purple spots and a broad white slightly waved margin. The laterals were slightly incurved, divided by two shades of colour; the upper halves were yellowish overlaid with purplish brown, the lower portions were somewhat less heavily shaded. The labellum was a similar colour to that of the upper areas of the laterals, and the ventral sepal was greenish. Flower measurements 4½ inches by 3 inches. Exhibited by Messrs. R. & R. Ratcliffe, Downlands Nurseries, Chilton, Didcot, Berks.

Cypripedium June Brae 'Ambrose' A.M. February 23, 1960. The parents of this hybrid are *C.* Dalla × *C.* Masked Light. The plant exhibited bore a flower 5 inches by 4 inches. The dorsal had a large white margin, with a green central area superimposed with maroon. Lateral tepals slightly incurved, wavy margined, golden green with a deep maroon central streak. The glossy labellum and ventral sepal were golden green in colour. Exhibited by Messrs. Wyld Court Orchids, Hampstead-Norris, Newbury, Berks.

Cypripedium H. Rushton 'Everest' A.M. January 12, 1960. *C.* Chilton × *C.* Whitemoor are the parents of this white flowered cypripedium cultivar. The laterals are incurved and tinged with green; the dorsal has a wavy margin, white lightly spotted with purple towards the mid-rib. The labellum was rather small and cream coloured; the lower outer tepal standing out behind ,and pure white. The size of the flower

shown was 4¾ inches. Exhibited by Messrs. R. & E. Ratcliffe, Downlands Nurseries, Chilton, Didcot, Berks.

Epidendrum Raiatea 'Hermon Slade' A.M. May 23, 1960. Parentage, *E. atropurpureum* × *E. selligerum*. A large branched cut spike of sixty-two flowers each measuring 2 inches across was shown. Tepals reflexed, reddish brown over a green base, the labellum rather large, light pink striped with crimson. Exhibited by Mr. O. M. Kirsch, Honolulu, Hawaii, U.S.A.

Miltonia Celle 'Feuerwerk' A.M. May 23, 1960. Parents of this cultivar *M.* Lydia × *M.* Lingwood. The fine plant shown carried two spikes, each with three fully developed flowers, measuring 4¾ inches by 4 inches, and the main colour is crimson. The large flat labellum is bifid with lines and dot markings radiating from the centre mask. These markings are pale rose coloured and the central area slightly splashed with orange. Shown by Mr. H. Wichmann, Celle, W. Germany.

Miltonia Celle 'Waterfall' A.M. May 23, 1960. Parentage *M.* Lydia × *M.* Lingwood. The plant exhibited carried six fully developed flowers on two spikes, each flower measured 5 inches by 3¾ inches. The upper tepals are slightly recurved, rich crimson in colour; the large flat labellum bifid, rich rose coloured with whitish lines and spots radiating from the central mask. Exhibited by Mr. H. Wichmann, Celle, W. Germany.

Odontioda Dalmar 'Lyoth Velour' A.M. May 3, 1960. Parentage of this cultivar is *Odm.* Mandalum 'Perfecta' × *Oda.* Margia 'Goliath'. The plant shown had a spike of six flowers measuring 3½ inches by 3 inches. The basic colour was deep ruby wine, side tepals slightly recurved with pale-rose striping at the margins. The large, rather flat labellum was bifid, white and with a central area of rich yellow with brownish blotches and light speckling at the sides. Shown by Messrs. Charlesworth & Co., Ltd., Haywards Heath, Sussex.

Odontioda Florence Stirling 'Lyoth Princess' A.M. April 5, 1960. This unique hybrid was obtained by crossing *Oda.* Astoria with *Oda.* Melina. The plant shown produced a large spike with ten well-shaped flowers, each measuring 4 inches by 3¾ inches. The tepals of the flowers had undulating margins and recurved apices, the ground colour being white with light brownish spots and wide rosy-purple outer band. The labellum was white with a central brown area, the upper side lobes speckled with small brown spots, and a yellow crest. Exhibited by Messrs. Charlesworth & Co., Ltd., Haywards Heath, Sussex.

Odontioda Purple Prince 'Vulcan' F.C.C. March 8, 1960. This cultivar is the result of crossing *Oda.* Apoda with *Odm.* Purple Queen. The plant exhibited bore a spike of nine fine large flowers each measuring 4½ inches by 4½ inches. The large serrated tepals had a wide mauve surround and maroon inserts. The labellum was white with a large area of yellow under the crest, and a large central maroon blotch surrounded by smaller markings of similar colour. This fine plant was exhibited by Hon. Mrs. N. Ionides, Buxted Park, nr. Uckfield, Sussex.

Odontioda Zorka 'Stonehurst' A.M. January 12, 1960. *Oda.* Janina × *O.* St. James are the parents of this very fine cultivar. The bright red colour was predominant over all the tepals. These tepals are reflexed at the apex and the scalloped margins attractively edged with white. The labellum white based with two central spots, the central area bright red edged with white. Upon the spike exhibited were nine fully developed flowers, each 2¾ inches across. Exhibited by R. Strauss, Esq., Stonehurst, Ardingly, Sussex.

Odontoglossum Eider 'Emperor' A.M. February 23, 1960. This cultivar is the result of crossing *O.* Berwick × *O.* Thella. The plant shown bore six well-spaced flowers, on an upright spike, individual flowers being 3½ inches by 3 inches. The tepals are fimbriated and the laterals held at right angles to the upright dorsal. The general colouring consists of irregular purple-maroon markings on a whitish background. The labellum was white with a brownish area at the base and a few smaller spots around the yellowish crest. Exhibited by Messrs. Stuart Low (Benenden) Ltd., Jarvis Brook, Crowborough, Sussex.

Odontoglossum Flamingo 'Lyoth Kivu' A.M. April 5, 1960. Parentage of this cultivar is *O.* Robert Strauss × *O.* Opheon. The plant shown produced a curved spike with seven well-developed flowers, measuring 3½ inches by 3½ inches. The basic colour of these well-formed flowers is deep purple-maroon with white. The tepals are broad-obovate in shape, with irregularly incised white margins. The labellum was large shield-shaped, dark brownish maroon with a white margin and the usual yellow crest. Exhibited by Messrs. Charlesworth & Co., Ltd., Haywards Heath, Sussex.

Odontoglossum Morning Sun 'Majestic' A.M. April 5, 1960. This cultivar was obtained by crossing *O.* Miramar with *O.* Bassanio. The plant produced a spike of four good-shaped flowers, individual flowers being 3¼ inches by 3½ inches. The basic colour is greenish yellow, and upon this background is superimposed a large number of brown blotches of different sizes and shapes. The labellum was white with yellow at the base and two irregular brown blotches in the centre with smaller spots around the margin of the upper lobes. Exhibited by Messrs. Stuart Low (Benenden) Ltd., Crowborough, Sussex.

Odontoglossum Ophyras 'Stonehurst' A.M. February 9, 1960. *O.* Opheon × *O.* Palmyras Queen are the parents of this hybrid. The plant exhibited bore a well-balanced spike of eight large, fully developed flowers, each measuring 3¾ inches by 4 inches. The general colouring was purple maroon with white in the fimbriated tepals. The handsome labellum was white with large purple-maroon markings and speckled along the undulating margins. Exhibited by R. Strauss, Esq., Ardingly, Sussex.

Odontoglossum Pacific 'Lyoth Mandarin' F.C.C. May 3, 1960. This fine cultivar was produced by crossing *O.* Crispinum with *O.* Ascania. The plant shown produced a fine curved spike of ten well-spaced flowers; each flower measured 4 inches by 4 inches. The tepals

were daffodil yellow in colour with a few small maroon spots here and there, the margins slightly undulated. The large labellum was white with three large brownish maroon spots in the central area, with smaller spots running along the margin back to the column. The crest was yellow. Shown by Messrs. Charlesworth & Co., Ltd., Haywards Heath, Sussex.

Odontoglossum Stropheon 'Lyoth Galaxy' F.C.C. March 22, 1960. The parents are *O.* Robert Strauss 'Delight' and *O.* Opheon 'Majestic'. Upon the plant exhibited were six large flowers of perfect form, individual flowers measuring 4 inches across, tepal width 2 inches. The basic colour of this outstanding hybrid was purple-maroon, the tepals with white or pale-rose edges; the lip had one large central maroon blotch surrounded by broad white band with light speckling. Exhibited by Messrs. Charlesworth and Co., Ltd., Haywards Heath, Sussex.

Odontoglossum Stropheon 'Lyoth Prince' F.C.C. May 23, 1960. This cultivar is the result of crossing *O.* Robert Strauss 'Delight' and *O.* Opheon 'Majestic'. The plant bore a spike of six well developed flowers, each measuring 4 inches by 4 inches, the lip 1½ inches long. The colouring was purple-maroon with a white band on the fimbriated tepals, the fine lip was white and purple-maroon with smaller spots around the large yellow crest. Exhibited by Dr. W. W. Wilson, 328 Righters Mill Road, Pennsylvania, U.S.A.

Phalaenopsis Juanita 'The Vern' A.M. March 22, 1960. The parents of this fine cultivar are *P.* Chief Tucker and *P.* Grace Palm. The spike exhibited carried six fully developed flowers and three buds. The individual flowers were 4¼ inches across: tepals 2½ inches wide. The colour glistening white with a yellow flush near the centre of the lip, with a few light brown markings. Exhibited by A. Schaffer, Esq., Santa Cruz, California.

Renantanda Careen Ishie 'Quek Seow Kee' A.M. May 23, 1960. The parents are *Renanthera storiei* × *V.* Manila. A fine cut branched spike with seventy-two flowers, each measuring 2 inches across was shown. The flowers brilliant flame coloured lightly mottled with crimson. Exhibited by Mr. Quek Kiah Huat, 57 Wilkinson Road, Singapore 15.

Vanda Janet Kanealii 'George Ing' A.M. May 23, 1960. This cultivar was produced by crossing *V.* Nellie Morley 'George Ing' with *V. sanderiana*. A cut spike of ten fully developed flowers each measuring 4 inches across by 3¾ inches high was shown. The fine large flowers had a pale rose ground overlaid with reddish brown and very heavily spotted with crimson; labellum rather small deep maroon coloured. Shown by Mr. G. Ing, Honolulu, Hawaii, U.S.A.

Vanda Nellie Morley 'Selsfield' A.M. May 23, 1960. This fine cultivar was obtained by crossing *V.* Emma van Deventer and *V. sanderiana*. The plant exhibited produced a sub-erect spike with five beautifully shaped flowers measuring 3½ inches across by 4 inches high. Tepals were rose colour spotted with rose-purple, and the dorsal tepal was

slightly richer in colour, labellum small, purple with three rose coloured lines. Exhibited by David Sanders Orchids Ltd., Selsfield, Sussex.

Vanda Rothschildiana 'Hilo' A.M. May 23, 1960. This cultivar is yet another hybrid with the popular *V. sanderiana* as one parent and *V. caerulea* as the other. A very fine spike of eighteen flowers was exhibited, each flower was 4 inches across by 4½ inches high. Tepals were slightly reflexed, blush-mauve; the protruding labellum was small and dark blue in colour. Exhibited by Mrs. A. Bowman, Hilo, Hawaii, U.S.A.

OTHER PLANTS

Begonia 'Elatior Rood' A.M. October 25, 1960. A very pleasing winter-flowering variety bearing great quantities of semi-double cherry (H.C.C. 722) flowers measuring up to 2 inches across. The plant is of neat pyramidal habit. Introduced by Messrs. Weimar & Eveleens, Aalsmeer, Holland, and shown by the County Borough of Brighton Parks & Gardens Department (Supt.: Mr. J. R. B. Evison, N.D.H.) (Fig. 1).

Begonia 'Eveleens' Orange' A.M. October 25, 1960. This outstanding winter-flowering variety is believed to be the result of a cross between B. 'Flambeau' and B. 'Flamboyant'. Its large single Dutch vermilion (H.C.C. 717/2) flowers measuring up to 3 inches across are produced with great freedom. The plant is of neat compact habit and has attractive dark foliage. Raised and introduced by Messrs. Weimar & Eveleens, Aalsmeer, Holland, and shown by the County Borough of Brighton Parks & Gardens Department (Supt.: Mr. J. R. B. Evison, N.D.H.).

Begonia 'Kersgeorchten' A.M. October 25, 1960. A very handsome white winter-flowering variety bearing great quantities of semi-double flowers measuring up to 2½ inches across and having very small green centres. Shown by the County Borough of Brighton Parks and Gardens Department (Supt.: Mr. J. R. B. Evison, N.D.H.).

Lilium 'Redstart' A.M. July 12, 1960. A most attractive lily resulting from crosses between seedlings from crosses between the triploid form of *L. tigrinum*, *L.* × *hollandicum* and *L. willmottiae* made by DR. J. C. TAYLOR of Canada. The 3-foot spikes exhibited each carried nine or ten partly reflexed flowers, about 4½ inches across and approaching Mahogany Red in colour. The individual perianth segments were about 3 inches long, and heavily spotted along three-quarters of their length. Exhibited by The Director, The Royal Botanic Gardens, Kew, Surrey.

Nerine 'Plymouth' A.M. October 11, 1960. This variety is the result of a cross between N. 'Joan' and N. 'Herga'. It carries on a stout scape an umbel of ten large Claret Rose (H.C.C. 021) flowers which have a darker streak in the middle of each segment. Raised and shown by Edmund de Rothschild, Esq. (gr.: Mr. F. Wynniatt), Exbury, Southampton.

Nerine 'Carolside' A.M. October 11, 1960. The Mandarin Red (H.C.C. 17/1) medium-sized flowers are borne ten in an umbel supported on a stout stem and the edges of the segments are attractively waved. The parentage is N. 'Rotherside' and N. 'Joan'. Raised and shown by Edmund de Rothschild, Esq. (gr.: Mr. F. Wynniatt), Exbury, Southampton.

WISLEY TRIALS, 1960

KNIPHOFIAS

Three stocks of kniphofias were received for trial at Wisley in 1959. Three plants of each stock were planted in the border neighbouring the broad walk on Battleston Hill on March 6,1959.

The trial was inspected by a sub-committee of the Floral Committee A on August 5 and September 15, 1960, and on its recommendation the Council has made the following awards to kniphofias after trial at Wisley.

The number in brackets after the description of the stock was that under which it was grown in the trials.

MAID OF ORLEANS. (Raised by Mr. J. J. Grullemans, Messrs. The Wayside Gardens Co., Mentor, Ohio, U.S.A., and sent by Messrs. Perry's Hardy Plant Farm, Enfield, Middlesex.) **A.M.** August 5, 1960. Plant 30 inches high; foliage $\frac{3}{8}$ to $\frac{4}{8}$ inch wide, bright medium green; flower spikes 42 to 47 inches long, averaging twelve to eighteen per plant. Flowers $1\frac{1}{2}$ inches long, $\frac{3}{8}$ inch wide at mouth, drooping, lower florets white veined cream, centre florets Primrose Yellow (H.C.C. 601/3), upper florets near Sulphur Yellow (H.C.C. 1/3) very slightly tipped red. Flowering from July 16, 1960. [3]

NELSONII MAJOR. (Sent by Messrs. T. Carlile (Loddon Nurseries) Ltd., Carlile's Corner, Twyford, Berks.) **A.M.** September 15, 1960. Plant 21 inches high; foliage $\frac{1}{8}$ inch wide, dull medium green; flower spikes 54 inches long, averaging twelve to twenty-three per plant. Flowers $1\frac{3}{16}$ inches long, $\frac{1}{2}$ inch wide at mouth, drooping, Indian Orange (H.C.C. 713/2) changing to a colour near Nasturtium Orange (H.C.C. 610/1) with maturity. Flowering from August 20, 1960. [2]

RHODODENDRONS

The Council of The Royal Horticultural Society has made the following awards to rhododendrons after trial at Wisley on the recommendation of the Rhododendron and Camellia Committee.

The number in brackets after the description of the variety was that under which it was grown in the trial.

Hardy Hybrid Rhododendrons

AZOR SISTER. (Raised, introduced and sent by the late J. B. Stevenson, Tower Court, Ascot, Berks.) **F.C.C.** June 15, 1960. Plant 12 feet high, 13 feet spread, vigorous, fairly compact upright habit, very free flowering; leaves $6\frac{7}{16}$ inches long, 2 inches wide, medium to dark, dull green. Flower truss 7 inches diameter, $4\frac{1}{2}$ inches deep, fairly compact, dome-shaped, nine flowers per truss; corolla $3\frac{1}{2}$ inches diameter, 3 inches long, funnel-shaped, margins crimped, Rhodamine Pink (H.C.C. 527/1), Turkey Red (H.C.C. 721)

at base, speckling on upper petal at throat Currant Red (H.C.C. 821). Flowering from June 10, 1960 [330]

FRANK GALSWORTHY. (Raised and introduced by the late A. Waterer; sent by Messrs. Walter C. Slocock Ltd., Goldsworth Nursery, Woking, Surrey.) **A.M.** June 2, 1960. Plant 5½ feet high, 9 feet spread, vigorous, fairly compact upright habit, very free-flowering; leaves 5½ to 6⅝ inches long, 1⅝ inches wide, medium to dark dull green. Flower truss 5 inches diameter, 4 inches deep, compact, globular-shaped, fifteen to twenty flowers per truss; corolla 2 to 2½ inches diameter, 2 inches long, funnel-shaped, margins entire, a colour near Garnet Lake (H.C.C. 828), spotting on upper petal very pale olive. Flowering from May 28, 1960. [715]

GOLDSWORTH CRIMSON. (Raised, introduced and sent by Messrs. Walter C. Slocock Ltd.) **A.M.** May 10, 1960. Plant 9 feet high, 13 feet spread, vigorous, compact slightly spreading habit, very free-flowering; leaves 5 to 8 inches long, 1⅝ to 2½ inches wide, medium dull green. Flower truss 7 inches diameter, 5 inches deep, compact, globular-shaped, thirteen to sixteen flowers per truss; corolla 3 to 3¾ inches diameter, 2 to 2⅛ inches long, funnel-shaped, margins entire, Crimson (H.C.C. 22/1), spotting on upper petal black. Flowering from April 25, 1960 [749]

ICE CREAM. (Raised, introduced and sent by Messrs. Walter C. Slocock Ltd.) **A.M.** June 2, 1960. Plant 5 feet high, 7½ feet spread, vigorous, fairly compact upright habit, free-flowering; leaves 4½ to 7½ inches long, $1\frac{7}{16}$ to $2\frac{3}{16}$ inches wide, medium dull green. Flower truss 7½ inches diameter, 4 inches deep, fairly compact, dome-shaped, twelve to fourteen flowers per truss; corolla 3½ to 3⅝ inches diameter, 2⅜ to 2⅝ inches long, funnel-shaped, margins entire, Camellia Rose (H.C.C. 622/3) with white throat, spotting on upper petal pale olive. Flowering from May 29, 1960. [954]

JAMES BURCHETT. (Raised, introduced and sent by Messrs. Walter C. Slocock Ltd.) **A.M.** June 15, 1960. Plant 10 feet high, 15 feet spread, vigorous, fairly spreading habit, very free-flowering; leaves 8 to 8⅝ inches long, 2 to 2½ inches wide, dark green. Flower truss 6 inches diameter, 4 inches deep, compact, globular-shaped, fifteen to seventeen flowers per truss; corolla 3½ inches diameter, $2\frac{7}{16}$ inches long, funnel-shaped, margins entire, white with a very pale touch of pink at margins, speckling on upper petal at throat yellowish green, buds Rhodamine Pink (H.C.C. between 527/2 and 527/3). Flowering from June 7, 1960. [374]

MRS. J. C. WILLIAMS. (Raised by the late A. Waterer, and sent by Messrs. Knap Hill Nursery Ltd., Lower Knaphill, Woking, Surrey.) **A.M.** June 2, 1960. Plant 7½ feet high, 12 feet spread, vigorous, slightly spreading habit, very free-flowering; leaves 4½ to 5½ inches long, 1½ to 1⅝ inches wide, medium dull green. Flower truss 4½ to 5 inches diameter, 4½ inches deep, compact, globular-shaped, sixteen to nineteen flowers per truss; corolla 2 to 2½ inches diameter, $1\frac{7}{16}$ to 1⅝ inches long, funnel-shaped, margins entire, white, spotting on upper petal reddish brown. Flowering from May 22, 1960. [383]

FLAVOUR. (Raised, introduced and sent by Messrs. Walter C. Slocock Ltd.) **H.C.** June 2, 1960. Plant 4½ feet high, 6 feet spread, vigorous, compact upright habit, very free-flowering; leaves 4½ to 5 inches long, 1½ inches wide, medium dull green. Flower truss 5½ inches diameter, 3 to 3½ inches deep, fairly lax, dome-shaped, eleven flowers per truss; corolla $2\frac{3}{16}$ to 2½ inches diameter, $2\frac{3}{16}$ to 2½ inches long, campanulate-shaped, margins entire, a slightly darker shade of Maize Yellow (H.C.C. 607/3), Mimosa Yellow (H.C.C. 602/2) at throat, spotting on upper petal maroon. Flowering from May 26, 1960. [955]

LANGWORTH. (Raised, introduced and sent by Messrs. Walter C. Slocock Ltd.) **H.C.** May 20, 1960. Plant 9½ feet high, 15½ feet spread, vigorous, spreading habit, very free-flowering; leaves 7 to 8 inches long, 2 3/16 to 3 inches wide, dark dull green. Flower truss 9 inches diameter, 7 inches deep, fairly lax, conical-shaped, sixteen flowers per truss; corolla 4 inches diameter, 2½ to 3 inches long, funnel-shaped, margins slightly waved, white, streaked greenish brown at throat, spotting on upper petal green. Flowering from May 14, 1960. [376]

Deciduous Azaleas

CLYDE. (Raised and sent by The Royal Horticultural Society's Gardens, Wisley, Ripley, Woking, Surrey.) **H.C.** May 20, 1960. Plant 4½ feet high, 6 feet spread, vigorous, spreading habit, very free-flowering; leaves 3½ to 4 inches long, 1½ inches wide, medium green. Flower truss 6 inches diameter, 3 inches deep, fairly compact, dome-shaped, twelve flowers per truss; corolla 3⅝ inches diameter, 3 inches long, funnel-shaped, margins crimped, white touched pink, heavy spotting on upper petal orange. Flowering from May 15, 1960. [157]

DEE. (Raised and sent by The Royal Horticultural Society's Gardens) **H.C.** June 2, 1960. Plant 4½ feet high, 5 feet spread, vigorous, compact upright habit, free-flowering; leaves 4 inches long, 1½ inches wide, medium glossy green. Flower truss 5½ inches diameter, 3½ inches deep, compact, globular-shaped, fourteen to seventeen flowers per truss; corolla 3 inches diameter, 2½ inches long, funnel-shaped, margins entire, white with slight flush of pink on reverse of upper petal, spotting on upper petal orange yellow. Flowering from May 26, 1960. [147]

GOLDEN EAGLE. (Raised, introduced and sent by Messrs. Knap Hill Nursery Ltd.) **H.C.** May 20, 1960. Plant 5½ feet high, 7 feet spread, vigorous, compact upright habit, very free-flowering; leaves 3½ to 4 inches long, 1⅝ to 2 inches wide, bright glossy green. Flower truss 6 inches diameter, 3½ inches deep, fairly compact, dome-shaped, ten to twelve flowers per truss; corolla 3 inches diameter, 2⅝ inches long, funnel-shaped, margins entire and dentate at apex, wide border of Nasturtium Red (H.C.C. 14/1) at margins, mid-rib a shade near Orpiment Orange (H.C.C. 10/2), blotch on upper petal Orpiment Orange (H.C.C. 10/1). Flowering from May 13, 1960. [805]

MRS. GOMER WATERER. (Raised, introduced and sent by Messrs. Knap Hill Nursery Ltd.) **H.C.** May 10, 1960. Plant 5 feet high, 7½ feet spread, vigorous, fairly spreading habit, very free-flowering; leaves 3 to 4 inches long, 1½ inches wide, medium glossy green. Flower truss 5½ to 6 inches diameter, 3½ inches deep, compact, dome-shaped, sixteen to seventeen flowers per truss; corolla 2½ to 2⅝ inches diameter, 2½ inches long, funnel-shaped, margins entire, white tinged Neyron Rose (H.C.C. 623/2), spotting on upper petal Lemon Yellow (H.C.C. 4), buds yellow tinged red. Flowering from May 4, 1960. [754]

RIBBLE. (Raised and sent by The Royal Horticultural Society's Gardens.) **H.C.** June 2, 1960. Plant 5 feet high, 5 feet spread, vigorous, compact upright habit, very free-flowering; leaves 3⅝ to 3½ inches long, 1½ inches wide, medium glossy green tinged brown. Flower truss 4½ to 5½ inches diameter, 3 inches deep, fairly compact, dome-shaped, thirteen flowers per truss; corolla 3½ inches diameter, 2½ inches long, funnel-shaped, margins frilled, a colour between Camellia Rose (H.C.C. 622/1) and Neyron Rose (H.C.C. 623/1), single upper petal bright orange. Flowering from May 24, 1960. [908]

TYNE. (Raised and sent by The Royal Horticultural Society's Gardens.) **H.C.** May 20, 1960. Plant 6 feet high, 5 feet spread, vigorous, compact upright habit, very free-flowering; leaves 4 inches long, 1⅝ inches wide, light to medium glossy green. Flower truss 5½ inches diameter, 3½ inches deep, compact, globular-shaped, eleven flowers per truss; corolla 3½ inches diameter, 2½ inches long, funnel-shaped, margins entire, Carmine Rose (H.C.C. between 621 and 621/3), blotch on upper petal orange. Flowering from May 14, 1960. [190]

WAVENEY. (Raised and sent by The Royal Horticultural Society's Gardens.) **H.C.** May 20, 1960. Plant 4½ feet high, 2½ feet spread, fairly vigorous, compact upright habit, free-flowering; leaves 4 to 5 inches long, 1⅛ to 1½ inches wide, medium glossy green tinged brown. Flower truss 4½ to 5½ inches diameter, 3 inches deep, compact, globular-shaped, twelve to eighteen flowers per truss; coroila 3½ inches diameter, 2⅝ inches long, funnel-shaped, margins waved, Buttercup Yellow (H.C.C. 5/2), blotch on upper petal Saffron Yellow (H.C.C. 7). Flowering from May 14, 1960. [894]

Evergreen Azaleas

FEDORA. (Raised by Messrs. C. B. van Nes & Sons, and sent by Messrs. Knap Hill Nursery Ltd.) **F.C.C.** May 10, 1960. Plant 3½ feet high, 7 feet spread, vigorous, spreading habit, very free-flowering, flowers borne in pairs; corolla 2½ inches diameter 1 1/16 inches long, funnel-shaped, Phlox Pink (H.C.C. 625/1), spotting on upper petal Cardinal Red (H.C.C. 822/3). Flowering from April 26, 1960. [549]

MAXWELLII. (Sent by Messrs. Knap Hill Nursery Ltd.) **A.M.** May 20, 1960. Plant 2¾ feet high, 6 feet spread, vigorous, spreading habit, very free-flowering, flowers borne in threes; corolla 2½ to 3½ inches diameter, 2⅛ inches long, funnel-shaped, Rose Bengal (H.C.C. 25/2), dark spotting on upper petal at throat. Flowering from May 10, 1960. [534]

PRINS BERNHARD. (Raised by Mr. A. Vuyk, introduced and sent by Messrs. Vuyk van Nes, Boskoop, Holland.) **A.M.** May 20, 1960. Described R.H.S. JOURNAL, **85**, p. 36. Flowering from May 8, 1960 (**H.C.** 1959). [124]

PURPLE TRIUMPH. (Raised by Mr. A. Vuyk, introduced and sent by Messrs. Vuyk van Nes.) **A.M.** May 20, 1960. Described R.H.S. JOURNAL, **85**, p. 36. Flowering from May 8, 1960 (**H.C.** 1959). [128]

VIDA BROWN. (Raised by Mr. Charles E. Brown, introduced and sent by Messrs. D. Stewart & Son Ltd., Ferndown, Dorset.) **A.M.** June 2, 1960. Plant 13 inches high, 31 inches spread, vigorous, spreading habit, very free-flowering, flowers borne singly; corolla 1½ to 1 7/16 inches diameter, 1 9/16 to 1 1/16 inches long, hose-in-hose, a colour near Rose Madder (H.C.C. 23/2). Flowering from May 20, 1960. [769]

LITTLE BEAUTY. (Raised by Mr. A. Vuyk, introduced and sent by Messrs. Vuyk van Nes.) **H.C.** May 20, 1960. Plant 2¼ feet high, 2¼ feet spread, vigorous, compact upright habit, very free-flowering, two to six flowers per truss; corolla 1⅜ inches diameter, 1¼ inches long, funnel-shaped, a colour near Phlox Pink (H.C.C. 625/1). Flowering from May 8, 1960. [127]

Awards were also given to the following rhododendrons growing in The Royal Horticultural Society's collection of plants at Wisley.

Hardy Hybrid Rhododendron

MOONSHINE CRESCENT. (Raised at The Royal Horticultural Society's Gardens.) **A.M.** May 10, 1960. Plant 4¾ feet high, 5½ feet spread, vigorous, compact upright habit, very free-flowering; leaves 4½ to 5 inches long, 1⅝ inches wide, dark dull green. Flower truss 5 inches diameter, 2½ inches deep, compact, globular to dome-shaped, fourteen to sixteen flowers per truss; corolla 2 3/16 inches diameter, 1½ inches long, funnel-shaped, margins entire, Primrose Yellow (H.C.C. between 601/2 and 601/3).

Evergreen Azalea

JITSUGETSUSE. H.C. June 15, 1960. Plant 1¾ feet high, 5½ feet spread, vigorous, very spreading habit, free-flowering, flowers mainly borne singly with a few pairs; corolla 2 1/16 to 2⅜ inches diameter, 1 7/16 inches long, funnel-shaped, Mallow Purple (H.C.C. 630/2), speckling on upper petal red.

NOTES FROM FELLOWS

Eucalyptus at Tresco Abbey

In the gardens and woodland surrounding Tresco Abbey in the Scillies, no fewer than thirty different species of *Eucalyptus* are grown. The mild climate of the islands makes this possible and some of the trees have reached a great size. All the members of this family are Australian and one of the interesting points about them is the extraordinary difference between the juvenile and the adult foliage, which often makes identification of young specimens very difficult, As a general rule the juvenile foliage is rounded and stalkless, often very glaucous and set horizontally so as to catch as much sunlight as possible, while the adult leaves are long and narrow and hang downwards on long stalks. An exception is found in *Eucalyptus cinerea*, also known as *E. pulverulenta*, in which the juvenile type of foliage persists (Fig. 9). This is a remarkably handsome, fast growing tree of a beautiful silvery-blue colour, which makes a striking contrast with the leaves of other trees in a mixed plantation. It grows extremely well on Tresco. Another fine gum, which flowered profusely there last September, is *E. ficifolia*, a very tender species. The foliage is dark green and the large flowers which overflow with nectar are a vivid flame red.

L. HUGH NEWMAN

Betsoms,
Westerham, Kent.

Cornish Shovel

I was interested to read the note on the Cornish shovel in the R.H.S. JOURNAL, for my father, the late JOHN BELLOWS (archaeologist and author of French Dictionary), found exactly the same in Georgia in the 1890s, and states (in a paper for the American Antiquarian Society) that the Phoenicians were known to have had settlements there. My father had a small shovel made by a blacksmith in Tiflis and it proved to be exactly the same shape as the Cornish one, which latter clearly was introduced to Cornwall by Phoenician traders and miners.

D. B. GERE

Woking, Surrey.

EXHIBIT OF SOUTH AUSTRALIAN PLANTS

An unusually interesting exhibit of native South Australian plants was sent from the Botanic Garden at Adelaide, South Australia, for the fortnightly Show on October 11 and 12. Most unfortunately, owing to a delay in the plane they did not arrive till the morning of Wednesday, October 12, but they were still in good condition and were immediately staged. The exhibit caused considerable interest among many of the Fellows, who were able to see it, since it included a number of unusual plants which are too tender for general cultivation here and so very rarely seen in flower. In particular, the flowers of several of the *Eucalyptus* species such as *E. torquata*, the Coral Gum, and also the Boronias and Chamaelaucium were much admired. *Boronia heterophylla*, the Red Boronia, was deeper in colour of flower than any of those recently seen, while *Chamaelaucium uncinatum*, the Geraldton "Wax-Plant", had pretty pink, rather waxy flowers. *Grevillea aquifolium* had holly-like leaves and pale pink flowers, and probably had not been seen in the hall for many years. The majority of these plants flower in our autumn and winter seasons and so are valuable for the Cool Greenhouse, but they require plenty of light, as in the new Australian House at Kew, to flower really well.

It is always very interesting for Fellows to be able to see plants from other countries and it is hoped that more exhibits of this type may be sent from time to time.

FELLOWS WISHING TO OBTAIN PLANTS RARE IN CULTIVATION

Will any Fellow who is willing to offer one of these plants please communicate direct with the Fellow who is seeking it and not with the Editor.

Daphne bholua *Daphne fortunei* *Daphne jezoensis* *Daphne kamtschatica* *Daphne sophia* *Daphne japonica* (not *odora*)	The Hon. H. Money-Coutts, c/o Robert Fleming & Co., 8 Crosby Square, London, E.C.3.
Helwingia rusciflora	Dr. B. C. Sharman, Bedford College, Regent's Park, N.W.1.

BOOK NOTES

"A Handbook of Succulent Plants." By Hermann Jacobsen. Translated by Dr. Hildegard Raabe. Three vols. 1,438 pp., illus. (Blandford Press.) 15 gs.

Many people will be familiar with *Succulent Plants*, by Herr Jacobsen, which was an English translation of his *Die Sukkulenten*, first published in 1935, a most useful reference book which has been much appreciated by those interested in this type of plant. In view of the number of new plants discovered and the botanical work done on the subject, however, it was becoming clear that a new edition was desirable. In 1954 a revised and enlarged edition of this work was published under the title *Handbuch der sukkulenten Pflanze*; the scope was greatly enlarged and consisted of three volumes, the third being entirely devoted to mesembryanthemums. Descriptions of 7,003 species and varieties in 380 genera are given and the arrangement is similar to that of the earlier work; the genera are arranged alphabetically and the species are also in alphabetical order under each genus. The book is fully illustrated and is a most valuable aid to the understanding of succulent plants.

Now this Handbook also has been translated into English and the opportunity taken of correcting errors and omissions. Herr Jacobsen has had the assistance of experts such as Gordon Rowley, who supervised the nomenclature, Hans Herre, R. Ginns and Dr. Louisa Bolus who read the proof, and other specialists who have made contributions on their own subjects. The number of plants included has been increased and there are now 1,617 illustrations. In the English edition the text is set in double columns which makes the short descriptions more compact and allows a better arrangement of the illustrations. It is unlikely that any book will be produced in the foreseeable future containing so much authoritative information in so compact a form; anyone who already possesses the German edition would find it useful to have the English one also. The author and his co-workers are to be congratulated on the thoroughness with which the subject has been treated and the publishers for their part in making this important work available to English-speaking peoples in so attractive a form.

VERA HIGGINS

"The Garden Flowers of China." By H. L. Li. 240 pp. Illus. (The Ronald Press Co.) $6.50.

The author of this book, Professor K. L. Li, a Chinese botanist with degrees at Chinese Universities and at present taxonomist at the Morris Arboretum and Associate Professor of Botany in the University of Pennsylvania, aims at giving in it something of the history of the most important flowers and plants to be found in Chinese gardens. Its most valuable and interesting sections are those devoted to relating the plants, which appear in ancient Chinese art and ideographs and are mentioned in its literature and mythology, to those cultivated in Chinese and Western gardens today. These sections are obviously the result of considerable learning and are a real contribution to horticultural and botanical studies. Expertise in various branches of knowledge has been required to produce them, in Chinese art, literature, ideography, etymology, folk-lore and of course, in botany. Important plants dealt with are paeonies, chrysanthemums and roses, and there is an interesting chapter on the "Chinese Sacred Lily", a variety of *Narcissus tazetta*. There is also a lengthy discussion of an unidentified plant, the "Mysterious Jade Flower", much renowned and esteemed in ancient China, and of which the author tells us no actual description exists for all that has been written about it. All said and done, it appears that it was probably some kind of hydrangea, possibly with yellowish scented flowers. Other chapters are a little trivial, particularly those on more recently introduced plants, and the writing is slack, e.g. of *Meconopsis betonicifolia* "It is a perennial plant, but in cultivation may appear to be a biennial. It tends to die down after flowering", but this is a defect of the whole book, and it is a pity that so much learning has not been expressed more precisely and in a tauter style.

MORTON

"Amateur Gardening Annual, 1960". Edited by A. G. L.Hellyer. 123 pp. Illus. (Amateur Gardening.) 6s.

This annual is full of short but interesting articles by various experts and with its abundant illustrations makes a handsome present for almost any gardener. Among others Mrs. Margery Fish writes on The Scented Garden, Mr. A. J. Smith on designing a small back garden with some quite novel ideas, Mr. Howard Crane on Violas, Mr. John Clayton on Berried Shrubs and Mr. Will Ingwersen on Bulbs for the Rock Garden.

"Venezuelan Orchids". By G. C. K. Dunsterville and L. A. Garay. 448 pp. Illus. Vol 1. (André Deutch Ltd.) 5 gns.

It is now well over a hundred years since the first extensive orchid collections, by Linden and Schlim respectively, were made in Venezuela but no comprehensive account of the orchids of that country has yet been published. Messrs. Dunsterville and Garay hope to publish in due course illustrations of all the orchids native to Venezuela, the present book being a first instalment of this project and containing illustrations of 200 selected species.

The very attractive and botanically accurate line drawings are by Mr. Dunsterville, while Mr. Garay, who is curator of the famous Oakes Ames Orchid Herbarium at Harvard in the United States of America, provides the text to each plate and the introductory chapter. This contains a general account of the family and of the geography of the country. It also includes 16 colour plates of especially striking species.

The orchids illustrated include representatives of practically all the more important Venezuelan orchid genera, from the large and beautiful Cattleyas, Oncidiums and Masdevallias down to charming miniatures such as *Platystele ornata* and *Notylia norae* which are scarcely 3 cm. in height overall. Orchid growers interested in species will find included striking rarities which are well worth cultivating, such for example, as the tiny *Oncidium glossomystax*, *Epidendrum porpax* and *Huntleya lucida*.

It is to be hoped that the publication of a further volume of this attractive and useful work will not long be delayed. V. S. SUMMERHAYES.

"The Orchids of Thailand." A Preliminary List. By G. Seidenfaden and Tem Smitinand. Crown 4to. 184 pp. + illus. (The Siam Society, Bangkok: Ejnar Munksgaard, 6, Norregade, Copenhagen.) Part I, D.Kr. 20.00; Part II (1), D.Kr. 22.00. Further parts to be issued.

Many orchidists today are growing species as well as hybrids and each year the collectors of "botanicals" are growing in number. The problem facing many of these growers is the identification of their species. Many of the countries from which native plants are imported have floras which enable specimens to be "run down". However, there have been many noticeable gaps, and Thailand, with several nurseries exporting local species, furnished a good example. This gap has now been filled by the appearance of *The Orchids of Thailand*.

Although serving a very useful purpose the work is not complete, as the authors themselves are the first to admit. Keys to many of the larger genera are provided and there are useful and accurate dissections and drawings of many of the species, but several taxonomic problems, though stated in detail, remain unsolved. A number of the species of several genera remain unnamed and have not been positively identified with any known species from another country; these plants are referred to by number only.

However, in bringing out this book now, instead of in the distant future when all the botany has been solved, the authors are to be congratulated. This incompleteness, rather than being a source of confusion should act as a source of encouragement for, and a guide to the future studies to be made with the plants and in the country.

Thailand, betwixt the Himalayan region and the tropical Malayan zones, must as a consequence have a rich and widely varied flora and it is certain that time and future exploration will bring to light many more species.

Mention must be made of the excellent reproductions of colour photographs at the end of each part and the high standard of printing and layout on a reasonable paper. Parts I and II (1) are now issued and Parts II (2), III and IV are under active compilation.

This book should definitely be in the hands of all amateur and professional orchidists and orchidologists and all those gardeners who still love Nature's flowers untouched by the hybridists. P. FRANCIS HUNT

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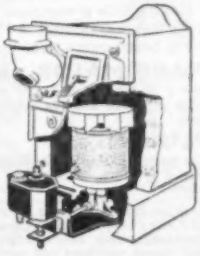

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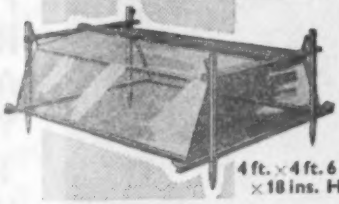

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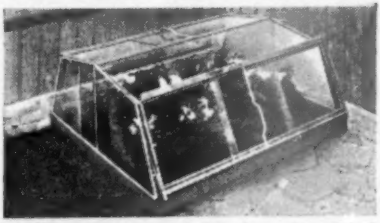

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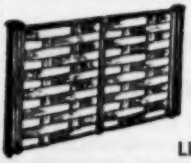

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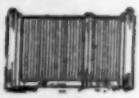

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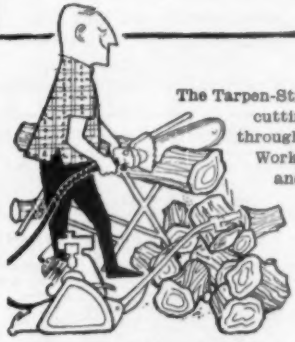

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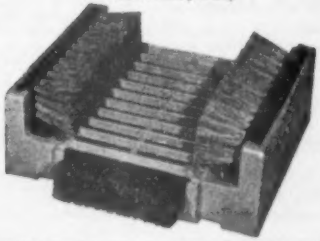

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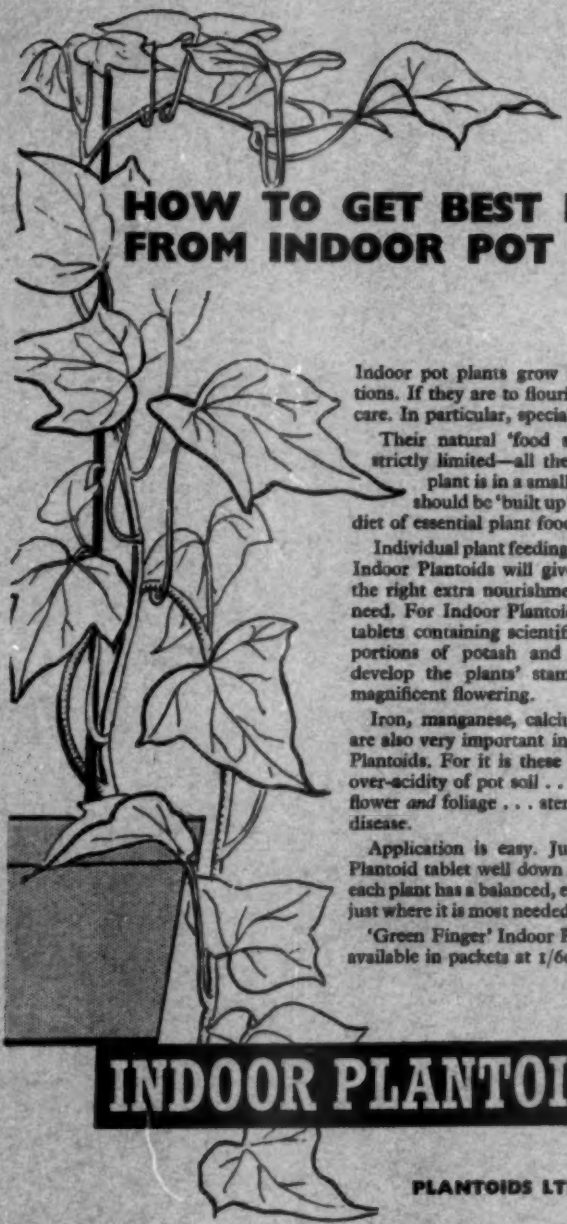

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